UTILIZATION OF NAVAL POWDER FACTORY, INDIAN HEAD, MD.

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BEFORE THE

SUBCOMMITTEE FOR SPECIAL INVESTIGATIONS

OF THE

COMMITTEE ON ARMED SERVICES
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REPORT OF THE SUBCOMMITTEE FOR SPECIAL INVESTIGATIONS, HOUSE ARMED SERVICES COMMITTEE, JULY 19, 1958

On July 10, 1958, the subcommittee at the direction of the Chairman of the Full Armed Services Committee, Hon. Carl Vinson, commenced an inquiry into the possible utilization of the naval powder factory at Indian Head as a source for the Polaris solid fuel propellent. This inquiry was precipitated by many public complaints on the diminishing workload of this factory with resultant employment and the implication that the award of a research and development contract to Aerojet-General Corp. for this solid propellent, to be used in the Polaris missile program, had in some way resulted in the Indian Head facility being overlooked or ignored.

The subcommittee viewed the facilities at Indian Head. This powder factory has been in existence since 1890. It had been progressively expanded commencing as late as 1951 and through 1956; some $27 million expended by the new construction.

The facilities have thus been expanded from the old type of propellant manufacture throughout the years. During World War II, it was a principal source of naval propellant. The heavy demands upon this factory resulted in burgeoning employment in this area; and personnel employed mounted to something in excess of 3,000.

The conclusion of World War II and the later Korean hostilities in progressive steps diminished the requirement for this type of powder; and as a result the workload for so-called conventional propellents has diminished.

It could not be hoped or expected that the accelerated production for World War II or Korea would continue as a matter of national policy when there was no requirement for this production. At least a major portion of the discharges were due to this diminishing workload and requirements for peacetime uses.

The question then resolved itself as to what peacetime uses or potential would be inherent at this factory.

It seems to the subcommittee that it is not correct to suggest that the Navy Department, as a matter of policy, ignored this facility. On the contrary, as a matter of authorization and appropriation there has been, until 1956, some $27 million of new and advanced, modern powder-producing equipment and plant situated there. This facility is now furnishing the entire propellent requirements for three very important Navy missiles.

What has happened is that the advent of the missile program has changed the need for powder both as to kind and military manufacture, thus rendering obsolete or obsolescent many facilities. In the foreseeable future, there will be a diminishing need, once the total stockpile requirement has been achieved. What is of immediate con-

cern is that the several technically qualified sources in missile propellent field plus the great urgency of the program, as a matter of national policy to improve our capabilities in the face of Communist threats in this area, required difficult, harsh, and, in some cases, drastic decisions in the interest of saving time.

The Polaris missile program is a fact. It is a matter of the greatest urgency and priority if we are to maintain our military balance. The Polaris program required a composite-type solid propellent, so that in considering facilities for the development of this fuel, the Navy was confronted with a situation in which there were no facilities for development or manufacture at Indian Head or among any private manufacturers excepting Aerojet-General Corp. facility at Sacramento. At Sacramento, the research on this type of propellent had been completed earlier and developmental work was in its initial stages. That is where and why the time element became the overriding consideration in the choice of this facility.

The subcommittee recognizes that manufacturing can be done anywhere; that facilities and tools and skills can be placed many places. But it must also recognize that where time becomes of the essence, it is important that every advantage be taken of existing facilities both as to plant and skills so that the long-lead time of building plant and assembling technical personnel will not be repeated; and thus extend a period of exposure to enemy attack. This is essentially the decision which the Navy had to make; and in making this decision, the subcommittee is satisfied that the facility at Indian Head in being was not in that sense either ready or competitive.

All solid fuels are not alike either as to composition or as to method of manufacture. For the use of the Polaris missile, upon which so much depends, it was vital to our security that we have the most advanced and potentially satisfactory fuel.

Indian Head powder factory is a capable, efficient production force "in being" for conventional solid propellent and for double-base-solid propellent; but it is not a developed source for the composite solid propellent which is essential to the success of the Polaris missile. That fuel must be case-bonded and contains different elements than the double-base-solid propellent which Indian Head is successfully capable of producing.

What would have been required to utilize Indian Head was essentially what would have been required from any of the private manufacturers of solid composite propellent. It would have been necessary to have started "from scratch." We have said that would have meant building a new plant, installing new machinery, and assembling skilled personnel.

It does not do well to argue that, of course, this could have been done in the past. The fact is that it was not done. The fact is that the pioneering in this field occurs as a result of the JATO propellent system of Aerojet-General Corp.

The testimony is that 479 scientists and technically trained people were located at Sacramento when the Polaris decision had to be made. There was in existence a plant for developmental purposes owned by the Navy at Sacramento. In short, there were the ingredients of a going concern "in being."

Days, weeks, months and even years became of overriding consideration. We cannot view the Polaris decision as a competitive engage-

ment between facilities and skills at Indian Head and facilities and skills at Aerojet-General. One had been begun and the other had not started.

However, the picture, as it emerges, is not one of hopelessness for Indian Head. Its position is far from irretrievable. Its skills and talents are neither downgraded nor lost because these things have happened:

1. The Navy has promised that a production proving line for the Polaris missile fuel will be established at Indian Head.

2. The subcommittee has had demonstrated to it, both visually and in the historical record of this facility, that Indian Head has fully proven technical competence and superior facilities for the type of work assigned to it.

It is also capable of expansion.

This same technical competence and capacity we are assured will be used after a technical breakthrough which is forecast at the moment from progress in research. All signs seem to indicate that the facilities at Indian Head will have a useful and important part in that development and production program among others. Indian Head is, therefore, an assured potentially successful contender for participation in the new weapons program.

Thus, while the subcommittee must reluctantly conclude that Indian Head facilities did not fit into the urgent and drastic action which had to be taken on the Polaris solid composite fuel propellent program, that fact by no means leads to any conclusion that Indian Head does not have the technical competence or capacity for other and related programs.

When there is added to that the attention which the situation at Indian Head has received and the interest awakened in the Congress plus the assurance of the Navy Department already indicated by an initial programing of production for composite propellent, the subcommittee believes the future of Indian Head to be encouraging.

3. These conclusions bring us to the broader phase indicated in the opening announcement of the subcommittee meeting.

In this report, we do not deal with Aerojet-General nor with other similar private contractors who are engaged in the weapons research and development system.

The ensuing activity of the subcommittee will concern itself, among other things, with the inventory of Government plants which are either in standby or unused, to determine whether any of these facilities are capable of utilization in whole or in part in the development of our new weapons systems.

Approved unanimously by the subcommittee, July 19, 1958; ordered printed and published.

F. EDWARD HÉBERT,
Chairman, Subcommittee for Special Investigations.

Approved July 19, 1958.

CARL VINSON,
Chairman, Armed Services Committee.

UTILIZATION OF NAVAL POWDER FACTORY, INDIAN HEAD, MD.

THURSDAY, JULY 10, 1959

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SPECIAL SUBCOMMITTEE FOR INVESTIGATIONS,
Washington, D. C.

The subcommittee met, pursuant to call, at 10 a. m., Hon. F. Edward Hébert (chairman of the subcommittee) presiding.

Mr. HÉBERT. The committee will be in order.

The Chair wishes to make a statement at the opening of this hearing.

For the information of witnesses and others interested, I shall state, very briefly, the purposes of this portion of the hearings which open this morning.

We have been directed by the chairman of the full Committee on Armed Services, Hon. Carl Vinson, to inquire into the circumstances under which the Indian Head Naval Powder Factory, an establishment of many years standing and proven experience in production of explosive propellents, has been, to some extent, abandoned in favor of privately owned facilities by contract of the Department of Navy.

This morning, our first purpose will be to have at hand the important facts with respect to the facility at Indian Head. At this point, I might also advise that the subcommittee has viewed these facilities on this Tuesday last. Next, we will hear, fully, the reasons impelling the Navy decision to establish the development and production of propellent for the Navy Polaris in private contractor facilities. The Navy Department and its representatives will have every opportunity to fully set forth their reasons.

I do not mean to suggest or imply that this inquiry will be limited to this particular competition between this private contractor and this Government facility.

The broader aspects of this whole subject are, of course, essential to an inquiry of this character. Later in the proceedings, we shall announce the direction and plans of the subcommittee in that respect.

Now, members of the committee, we have with us this morning by invitation, sitting with the committee as part of the committee, our distinguished colleague from Maryland, Mr. Lankford.

We also invited to be present, and hope he will avail himself of the opportunity, General Devereux, also a distinguished colleague of ours from the State of Maryland. However, his district is not affected by this present discussion. It is in Mr. Lankford's district. And it was through Mr. Lankford that this matter was brought to our attention. And in keeping with the policy of the committee, whenever a Mem-

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ber of the Congress brings to our attention a matter which comes within the purview of our hearings, we always ask him to sit with us and to participate in the meeting.

Mr. Courtney, you may proceed.

Mr. COURTNEY. Mr. Chairman, the Navy Department has selected for its witnesses and presentation this morning the gentlemen who are here seated at the table. And they have been given the broad outlines of the committee's area of interest and will handle that discussion in their own way and by prepared statement.

Now, Mr. Chairman, the first witness is Mr. Fred Bantz, Assistant Secretary of the Navy for Materiel. He is to be followed by Admiral Stroop, Admiral Raborn, and Captain Atkins, and Captain Peterson to the extent that they may have pertinent information.

Mr. Secretary, you have a prepared statement, and under the rules of the committee you proceed in order and without interruption.

STATEMENT OF HON. FRED BANTZ, ASSISTANT SECRETARY OF THE NAVY FOR MATERIEL

Secretary BANTZ. Thank you.

Mr. Chairman and members of the committee, I am pleased to appear before you this morning in connection with your consideration of the Naval Powder Factory, Indian Head, Md. I shall confine my remarks to the policy of the Navy concerning the use of Government-operated and contractor-operated industrial facilities in support of a major national defense program. Rear Adm. P. D. Stroop, Chief of the Bureau of Ordnance, and Rear Adm. W. F. Raborn, Director of Special Projects, Bureau of Ordnance, are here to speak to the technical aspects of the problem and are prepared to review the problem in detail.

Before reviewing Navy policy, I want to emphasize a most critical point as regards production of weapons. The Polaris missile, in the opinion of those most familiar with it, promises to be one of the most effective deterrents in the arsenal of the United States to forestall or discourage the outbreak of a major world conflict. With this critical point ever before us, we have done everything possible to speed up the Polaris program so that this missile will assume its role as a major deterrent and at the earliest possible moment. Decisions to employ either Government-operated or contractor-operated industrial plants in support of the Polaris program have been made on the basis of—will the use of either a Government-operated plant or a contractor-operated plant contribute most to meeting the tight deadlines laid down for the program.

Our policy principle in the procurement of weapons is to get delivery on time of the highest quality possible at the lowest cost obtainable. The policy of the Department of Defense on the use of contractor-operated and Government-operated facilities reflects this principle.

The Navy encourages the use of free, competitive enterprise, but realizes that Government-operated plants can and should be used in certain instances.

Reflecting this policy, the Navy has great flexibility in having available resources of Government-owned plants which are Government operated, Government-owned plants which are privately op-

erated, and privately owned plants. The decision to use one type of industrial plant or the other must be made on the basis of who is best equipped to meet the Navy's requirements on the principle as expressed above.

In the case of the Bureau of Ordnance, there are a number of Government-owned industrial plants and laboratories which are operated by private firms. Some of these facilities are retained in Government ownership in order to insure availability of capacity in the event of mobilization.

Such factors as safety—geographical location—and production capacity are factors which have to be considered in making a decision as to their retention. In the case of Government-owned, contractor-operated facilities, the Bureau of Ordnance is disposing of several plants no longer needed because of changing requirements or built-in inflexibility to satisfy today's needs without substantial additional costs and slowing up of the item or project.

As I said above, Government-owned facilities do have a role to play; not only for procurement, but, in addition, they provide training and experience for Government personnel in order to maintain the Government's ability to administer research and development, as well as production. They also provide an incentive to private enterprise to develop better weapons at lower costs.

To summarize, the Department of Defense and the Navy encourage the use of private enterprise in satisfying requirements for weapons, but recognize the value of Government-operated facilities in meeting the needs of the services.

Mr. HÉBERT. Thank you very much, Mr. Secretary. Now, I will start with the last, first, that last paragraph. Does that mean, also, without consideration of cost?

Secretary BANTZ. Sir?

Mr. HÉBERT. Does that statement in the summarization in the last paragraph mean without regard to cost?

Secretary BANTZ. No; not necessarily. It means entirely as we expressed above, as to the ability of the plant to produce the particular weapon in mind, and whether or not the time needs can be met and, also, the cost.

Mr. HÉBERT. Is the cost a determining factor? Supposing a private plant and a Government plant are in competition, one with the other, and it is proved that the lower cost would be reflected in the use of the Government-operated plant, all other factors being equal, which plant would be selected?

Secretary BANTZ. All other factors being equal, Mr. Hébert—and that is a rather difficult situation, because you very seldom have a case where all other factors are equal—then I would say the lowest price would be the determining factor.

Mr. HÉBERT. Well, let's say supposing one place could turn out one type of propellent—I mean an independent, private contractor could produce a propellent which would be ready to be used in a missile, and a Government establishment could turn out a propellent which could be able to be used in a missile, but at a lower cost, which plant would you select?

Secretary BANTZ. If time element involved were the same, we would select the Government plant.

Mr. HÉBERT. All right. Now, that brings me to the second question. You used the words that I was going to quote you on, on the second page, in which you say this:

*** * * will the use of either a Government-operated plant or a contractor-operated plant contribute most to meeting the tight deadlines laid down for the program.**

Do I understand by that statement that cost is of secondary consideration?

Secretary BANTZ. In Polaris, yes, sir.

Mr. HÉBERT. It is? Cost is of no consideration?

Secretary BANTZ. No; I didn't say that. I said it was a secondary consideration.

Mr. HÉBERT. Secondary consideration?

Secretary BANTZ. Yes, sir.

Mr. HÉBERT. In other words, it is more important to meet the deadline than how much it costs.

Secretary BANTZ. Very definitely. That was our prime objective.

Mr. HÉBERT. Mr. Hess?

Mr. HESS. No questions.

Mr. HÉBERT. Mr. Gavin?

Mr. GAVIN. No questions.

Mr. HÉBERT. Mr. Cunningham?

Mr. CUNNINGHAM. No.

Mr. HÉBERT. Mr. Bates?

Mr. BATES. No. questions.

Mr. HÉBERT. Mr. Lankford?

Mr. LANKFORD. No questions.

Mr. HÉBERT. Mr. Courtney?

Mr. COURTNEY. No questions, Mr. Chairman.

Admiral Stroop has a prepared statement, I believe, and we are getting down now to the decision, I take it. Rear Adm. Paul D. Stroop, Chief of the Bureau of Ordnance.

Admiral, will you proceed, as we have been doing?

Admiral STROOP. All right, sir.

Mr. COURTNEY. Do we have copies of your statement for the members?

Admiral STROOP. Yes, sir.

Mr. KUHN. They have been distributed.

Mr. COURTNEY. All right.

STATEMENT OF REAR ADM. PAUL D. STROOP, CHIEF OF THE BUREAU OF ORDNANCE

Admiral STROOP. Mr. Chairman and gentlemen, I appreciate the opportunity to appear before this committee to furnish information and answer any questions that you may have concerning the Naval Powder Factory, Indian Head, Md. This is a Government owned and operated facility under the management control of the Bureau of Ordnance of the Department of the Navy.

BACKGROUND INFORMATION ON THE NAVAL POWDER FACTORY

The Naval Powder Factory was established at Indian Head, Md., in 1890, and since that time it has been continuously concerned with

the manufacture of Ordnance propellents and explosives. Prior to 1951, the Naval Powder Factory worked exclusively on gun propellents and propellents for small rocket applications. These were manufactured by the extrusion process. In 1951, another production facility was established for the manufacture of propellents for guided-missile applications. These propellents were produced by the casting process wherein solid grains of a nitrocellulose composition were combined in a mold with a liquid nitroglycerine compound to form a molded solid-propellent grain of uniform composition. These two manufacturing processes continued concurrently with significant workloads being maintained in the manufacture by the extrusion process of gun-type and rocket-type propellents until 1956. At that time, the extrusion processes for manufacture of gun-type propellent were practically eliminated due to no immediate requirement for manufacture of this type of munition.

At the present time the manufacture of cast double-base propellents for guided missiles and rockets represents the major workload at the Naval Powder Factory.

The Naval Powder Factory has never engaged in the manufacture of propellents of the composite type, but a pilot-line composite propellent facility is currently being established there.

This facility will provide capacity for the production and loading of medium size rockets (up to 600 pounds of propellent), used in jet-assisted takeoff applications. This composite facility will not be capable of producing rockets of the Polaris size without major expansion and modification of the facility.

Just prior to World War II, in 1940, the average employment at the Naval Powder Factory was 1,150. During World War II employment at the Naval Powder Factory reached a peak of 3,500 civilian employees; however, the employment level dropped after the end of hostilities until only 1,093 employees were on the payroll as of June 30, 1950.

Then, as a result of the Korean conflict the employment rose to 3,044 employees as of June 30, 1953. Subsequent to the Korean conflict the employment level has been reduced periodically until the employment level on June 30, 1958, was 1,379 employees.

The Government has a present capital investment in the Naval Powder Factory of about $80 million. It should be noted, that of this amount over $27 million has been expended since 1952 to modernize the factory and to introduce new processes for new weapons.

The industrial complex at the Naval Powder Factory includes both production and research capabilities. The primary work of the Naval Powder Factory at the present time is the production of cast double-base propellents and other propellents (both gun and rocket) to meet the Navy's peacetime requirements.

The research and development program is primarily in the area of process and chemical engineering in support of the production effort. However, several exploratory research programs are supported in order to maintain a high technical competence in the research and development department.

The Bureau of Ordnance administers two other facilities for the development of propulsion systems utilizing solid grain double-base propellents. These are the Allegany Ballistics Laboratory, Cum-

berland, Md. (cast propellents), and the Naval Ordnance Test Station, China Lake, Calif. (extruded propellents).

After a solid propellent for rocket or missile application has been developed at either of these facilities the production program is transferred to the Naval Powder Factory for propellent production and loading. At the present time the Naval Powder Factory is producing all of the Navy's peacetime requirements of extruded and cast double-base propellents for guided-missile applications, such as those for Terrier, Talos, and Sidewinder.

BACKGROUND ON SOLID PROPELLENTS

Solid propellents for rocket applications may be divided into two generic types: (1) Double-base propellents; and (2) composite propellents.

Double-base propellents consist of a mixture of nitrocellulose and nitroglycerin blended into a homogeneous mass. Double-base propellents may be produced into propellent charges by either extrusion or casting techniques. These rocket and missile propellents are a direct outgrowth of the extensive work done on gun propellents.

In general, both research and production of double-base propellents have been done at Government stations or contractor-operated Government facilities, such as the Naval Powder Factory at Indian Head, Md., the Naval Ordnance Test Station at China Lake, Calif., and the Allegany Ballistics Laboratory at Cumberland, Md.

Composite propellents are basically a heterogeneous mixture of an organic fuel, such as rubber or plastic, and an inorganic salt containing oxygen, such as ammonium perchlorate or ammonium nitrate.

The first significant work on composite propellents in this country was performed at the California Institute of Technology early in World War II under the sponsorship of the Office of Scientific Research and Development. This work resulted in the development of asphalt composite propellents.

The Aerojet Corp. was formed in 1942 to exploit this propellent for jet-assist-takeoff (JATO) applications. Research work continued at the jet propulsion laboratory at the California Institute of Technology under Army sponsorship and, by the end of World War II, that institute had developed a rubbery, case-bondable composite propellent based on a liquid rubber fuel which was produced in quantity by the Thiokol Chemical Co.

This company entered into solid propellent production under Army sponsorship at Redstone Arsenal at Huntsville, Ala. It should be noted that from the beginning composite propellents have been exploited by private commercial companies; but almost all of the research and development work in the composite propellent field has been sponsored by the United States Government through research and development contracts.

Since World War II double-base and composite propellents have been competitive for many applications. Prior to the development of a rubbery type binder for composite propellents, all solid propellents were hard rigid materials. They had little or no flexibility and therefore, had to be loaded into rocket motors as cartridge charges.

With the advent of rubbery propellents it became possible to cast the propellent directly into the rocket motor and bond the propellent

directly to the rocket case. This technique permitted the design of higher performance rocket propulsion systems, because a higher loading density of propellent could be achieved. The rubbery nature of the propellent permits it to expand and contract with the metal rocket chamber and remain bonded to the metal surface without cracking or separating from the case.

With the advent of case bondable systems the composite propellents held a definite advantage over double-base propellents for large motor applications. However, in the past 18 months the Allegany Ballistics Laboratory has demonstrated the feasibility of case bondable double-base propellents. This is a very important new development and the double-base system can now be competitive for large motor applications. The Bureau of Ordnance of the Navy Department has an aggressive program underway to exploit these new double-base propellents.

POLARIS PROGRAM

When the decision was made to utilize solid prolellents in Polaris, it was determined that the propulsion systems should use propellents that could be case bonded. This approach was necessary in order to get the maximum energy in the smallest package. At that time only composite propellents of the Thiokol or Aerojet types were available. The decision was made by the Navy to go to Aerojet for these rocket motors.

Aerojet had extensive Navy-owned facilities at Sacramento which were being used for limited JATO production and these facilities were available for work on Polaris with suitable modifications. It should be noted too that Aerojet was at that time an experienced rocket propulsion system developer, with experienced manpower, not only in the area of propellents, but also in the areas of inert components and overall rocket design.

Now, with the recent advent of high performance, case bondable, double-base propellents, serious consideration is being given to the development of a second stage Polaris motor utilizing this propellent system. Ultimately, if this development is successful, the propellent could and probably will be manufactured at the Naval Powder Factory.

FACTORS INFLUENCING QUANTITIES OF PROPELLENTS PRODUCED

Prior to the advent of missile and nuclear weapons, saturation type weapons—for example, guns, bombs, barrage rockets—were the principal weapons of warfare. These saturation type weapons were mass produced in large numbers and utilized large quantities of propellents.

Missiles and nuclear weapons opened up a new and more sophisticated type of warfare. The kill probability for these weapons is relatively high; therefore, the number of projectiles required in any specific instance has been greatly diminshed with even greater kill probability than that which obtains with conventional weapons.

In gun type weapon systems propellents were a major cost item but in the more accurate and effective missile type systems they represent a relatively small part of the cost.

It should be noted, too, that the major propellent costs in a missile application are associated with the development phase and the quali-

fication phase of the rocket propulsion system. This is particularly true during peacetime when the number of missiles produced and expended for training purposes will be limited by the high overall costs of these missiles.

These factors indicate that the Armed Forces will in all probability never again require the quantities of solid propellents, even in wartime, that they have used in the past.

INTERSERVICE COOPERATION

In the field of ordnance and particularly in the area of solid propellents there is uniformly excellent interservice cooperation. The Solid Propellant Information Agency was established after World War II at the Applied Physics Laboratory, Johns Hopkins University, Silver Spring, Md.

The establishment of this Agency was the result of a joint agreement of the Army, Navy, and Air Force and the support of this work has been shared equally by the three services. The Solid Propellant Information Agency provides a means for a free exchange of classified information in the field of solid propellents.

Semiannual meetings have been held for many years between the Chief of Army Ordnance and the Chief of the Bureau of Ordnance of the Navy Department to discuss mutual problems in the ordnance area. Meetings of this type plus continuous liaison among the three services have resulted in a very well developed plan of cross servicing.

Both the Air Force and Army have utilized the Allegany Ballistics Laboratory, a Government-owned contractor-operated facility under the management control of the Bureau of Ordnance, as the development agency for solid propellent propulsion systems. In fact the Snark booster (Air Force) is in the final stages of qualification at the Allegany Ballistics Laboratory and is scheduled to go into production at the Naval Powder Factory in the near future. In turn, the Navy procures various propellent items from Army production facilities, such as sheet powder for extruded rocket propellents and special casting powders for cast double-base propellents.

In the area of cast double-base propellents an agreement has been made between the Army and the Navy that the Navy will meet all of its peacetime requirements at the Naval Powder Factory and that the Army will maintain the capacity to produce bulk solid propellents to meet the Navy's mobilization requirements.

It might be noted, too, that currently there are more than 250 tasks in the guided missile field being performed by the Bureau of Ordnance for the other services in facilities belonging to the Bureau of Ordnance or to its contractors.

POTENTIAL WORKLOAD AT THE NAVAL POWDER FACTORY

Accepting that the peacetime requirements for gun and extruded rocket propellents will not increase, the future production of the Naval Powder Factory is dependent upon service requirements for cast propellents for missile applications, and will also have some future productions in the field of composite propellents in the new facility now being installed.

Regarding the cast propellents, it is anticipated that the requirements for Terrier boosters and sustainers will continue and in the immediate future the Naval Powder Factory will go into production of Talos boosters and Snark boosters. Should the case bondable, double-base propellent prove feasible for the second stage of Polaris, production of this unit would significantly add to the workload.

Potential workload exists based upon mobilization requirements and any unforeseen demands upon presently unused capacity. No immediate effort is anticipated in these areas; however, this situation could change with changing world conditions.

SUMMARY

In summary, gentlemen, I would like to emphasize the following points:

(*a*) Although the Naval Powder Factory is only operating at about 50 percent capacity, it is now producing all of the Navy's requirements in the cast and extrude double-base propellent field.

(*b*) The current establishment of a composite propellent pilot line will broaden the base for new propellent work at the Naval Powder Factory. It will not provide a Polaris composite capability.

(*c*) To provide a Polaris composite capability would require extensive conversion of existing cast propellent facilities now used for other essential missile programs and earmarked for full production on mobilization, or the costly construction of completely new facilities.

(*d*) There is, however, the possibility of additional work for the Naval Powder Factory in the Polaris area if present very promising developments are successful.

(*e*) The decision to go to Aerojet for the Polaris motor was sound and was the only practical one in view of the time available for development. Here, in an existing Government plant, staffed with competent scientists and engineers, the maximum progress could be made and in fact no other course of action was acceptable or practical.

(*f*) The Navy Department considers the Naval Powder Factory an important and vital part of its ordnance establishment and every effort will be made to support and maintain this facility as a modern propellent plant.

Mr. HÉBERT. Admiral, I refer to designation (*e*):

The decision to go to Aerojet for the Polaris motor was sound and was the only practical one in view of the time available for development.

I emphasize what I now read.

Here, in an existing Government plant, staffed with competent scientists and engineers, the maximum progress could be made and in fact no other course of action was acceptable or practical.

Is the committee to understand by that statement that the present expansion of facilities by Aerojet in California is being made in a Government-owned plant?

Admiral STROOP. Yes, sir.

We had about 3 years ago at Aerojet an investment of about $6 million in Government-owned facilities—Navy, that is. That is exclusive of the Air Force.

When Admiral Raborn's very competent scientists and engineers got together and selected a composite propellent system for his Polaris

motor, he had essentially two choices. That is, he could go to two companies. After looking over their proposals, he decided upon Aerojet.

Mr. GAVIN. Who was the other company?

Admiral STROOP. The other company was the Thiokol Chemical Corp.

Mr. GAVIN. The who?

Admiral STROOP. Thiokol—T-h-i-o-k-o-l.

After that decision was made, the Navy Department, Admiral Raborn's special project, has progressively installed additional facilities in order to take care of this very large system.

We have details on that, even a few graphs, if the committee would like to look at those.

Mr. HÉBERT. Now, the committee on its visit the other day to the powder plant at Indian Head was given to understand that that was the only Navy facility of its kind in the country, is that correct?

Admiral STROOP. That is the only double-base production plant operated by the Navy; yes, sir.

Mr. HÉBERT. That particular propellent. That is what they meant to say.

Admiral STROOP. That particular propellent, and it is the only one of its type that is managed by the Navy.

You see, Indian Head is staffed with Navy paid personnel, civil service personnel.

Aerojet was a contractor operated plant. And at Aerojet, they had not only Navy facilities, but they had some of their own facilities, and I believe the Air Force has a sizable facility there.

Mr. HÉBERT. Well, now, Aerojet in Sacramento, the physical plant, is owned by the Navy?

Admiral STROOP. Only part of it, sir.

Mr. HÉBERT. Well, I am trying to find out.

On this expansion of Aerojet, how many millions of dollars—that has not been in the record and I will ask you if you are competent to answer the question.

Admiral STROOP. Yes.

Mr. HÉBERT. How many millions of dollars is being spent in Sacramento by Aerojet in connection with the progress of the Polaris program?

Admiral STROOP. At Sacramento——

Mr. HÉBERT. In expanded facilities.

Admiral STROOP. Yes, sir. At Sacramento, the total increase in the Government's investment by the Bureau of Ordnance during this period (January 5, 1956, to the present) is in the approximate amount of $22,201,000. Of this amount, $5,582,000 covers Government furnished equipment transferred from the Department of Defense Reserve.

Mr. HÉBERT. Will be spent in expanding——

Admiral STROOP. That is by the Navy. Admiral Raborn can elaborate on that if you would like.

Mr. HÉBERT. No. The question I am trying to arrive at—I think it is a very key question to the whole program.

Admiral STROOP. Yes, sir.

Mr. HÉBERT. This committee, or certainly I have understood that the Indian Head plant, totally Government owned, was bypassed in

favor of expending—and I now use the figure which you gave—$18 million by a private corporation for a private plant, to do Navy work.

Admiral STROOP. I would like to pass that to Admiral Raborn.

Mr. HÉBERT. Anybody can answer.

Admiral RABORN. Mr. Chairman, the facts in the case are these:

In 1956, when we first became interested in ballistics missiles in the Navy and got an active program going, early 1955 as a matter of fact, late 1955, the Navy had a naval industrial reserve ordnance plant located at Sacramento, operated by the Aerojet General Corp., contractor operated, that is. This was a solid propellent research and development plant. They had there invested some $6 millions which was at that time relatively unused and was available to the Navy for fast start on a very fast program.

Mr. HÉBERT. Now, we are addressing ourselves to a physical plant.

Admiral RABORN. We are addressing ourselves to a physical plant owned by the Navy, contractor operated by Aerojet Corp.

They had in addition——

Mr. GAVIN. Let me get it straight now. Who had the $6 million in, the Aerojet or the Navy?

Admiral RABORN. The Navy.

Mr. GAVIN. Right. So it was a Navy-financed project from the start.

Admiral RABORN. Yes, sir.

Mr. GAVIN. Can you give us some of the background of the Aerojet? Were they just a simple engineering outfit that you had associated yourself with, or had they had any plant facilities or any investment other than their engineering technique that you were taking into consideration?

Admiral RABORN. They have been in the solid propellent business for a number of years, as Admiral Stroop mentioned, I believe, in his prepared statement.

They had been developing and building a new type of solid propellent, known as the composite type, which had been very successful in JATO's for airplanes and other rocket motors of small, relatively small size, relative to the Polaris missile motor.

The type of propellent which they had developed was particularly adaptable to very large motors, something which the world had never before seen or built.

Intensive investigation and, of course, a continuous followup on the know-how of the solid propellent industry in this country clearly indicated that this type of propellent was the only one suitable at that time, 3 years ago—as a matter of fact, right now we still feel that way, although there will be progress made in other types—the only type that could be made available that required no technical breakthrough to give us a motor for the solid propellent Polaris ballistics missile.

In addition to this—and I believe this is directed to your question—they had some 600 highly qualified scientists, with supporting technical people, which was a development team of proven capability—development team, research and development team.

This combined with their excellent solid propellent which was by all recognized as the one that gave the most promise for giving us a motor, plus a Navy owned initial capability which as I said before

would give us a fast start on this program and we wouldn't have to spend a year building some facilities in order to get started on casting a limited number of motors and testing them—gave us the kind of combination that we needed to make this Polaris get off to a good start.

I am very glad to say to this committee that within a year and a half to 2 years we have exceeded the goals which we had set for ourselves for the calendar year 1963.

We have proven out and tested out on the ground the complete Polaris motor, and we are simply delighted with the progress that we have made, so much so that there has been great interest, as you know, in the other two services to follow in the Navy's lead.

Mr. LANKFORD. Mr. Chairman——

Mr. HÉBERT. Just let me clear up one thing, Mr. Lankford, supplementing what Mr. Gavin has asked, in connection with the original contract with Aerojet of $6 million. Now, that was a research and development program. That was an expenditure to know-how and ingenuity and brains?

Admiral STROOP. That is only partially correct, sir.

This $6 million facility did research and development work, but also it did production work in the field of JATO's—jet-assisted take-off applications.

Mr. HÉBERT. JATO is combined with the other, then, the original $6 million.

Admiral STROOP. That is right.

Mr. HÉBERT. Production was combined.

Admiral STROOP. Production was combined.

Mr. HÉBERT. I am trying to differentiate, as you understand.

Admiral STROOP. Yes, sir.

Mr. HÉBERT. Between production and know-how.

Admiral STROOP. Yes, sir.

Mr. HÉBERT. In whose plant was the production? Was that in the Navy plant?

Admiral STROOP. That was in the Navy plant.

Mr. HÉBERT. And the continuation of ownership and expansion of physical facilities still remains in the Navy?

Admiral STROOP. Yes, sir.

Mr. HÉBERT. In other words, the private individual, Aerojet or anybody else, or calling it by another name, that is employed for the know-how and research and development program is separate and apart from the production side which remains in the Navy?

Admiral STROOP. Well, it is a single management concept, sir. Aerojet manages this complex, which contains their own private facilities, they own all of the land, and they also man and operate the Navy facilities there.

Mr. HÉBERT. I think this: I am not trying to think for Mr. Gavin, particularly knowing of his interest in the matter.

The background is this: Does the Government come into the picture whereby it supplies the money to build plants which are eventually or at that time owned by the private contractor, for which the Government pays and yet the title vests in the——

Admiral STROOP. No, sir.

Secretary BANTZ. May I answer that?

Mr. HÉBERT. Yes, answer it. That is what I would like to know.

Secretary BANTZ. The buildings, that is the Navy-owned buildings, the Navy-financed buildings, are on land owned by the Aerojet Corp. There is a rather complicated——

Mr. GAVIN. Wait a minute. Let's get that straight.

Mr. HÉBERT. That is what you want?

Mr. GAVIN. That is right.

The Aerojet owned the land?

Secretary BANTZ. That is right.

Mr. GAVIN. And then the Navy invested in Aerojet—not in Aerojet, but the Navy financed the building and construction of the plants to develop the Polaris further, is that right?

Secretary BANTZ. The Navy-owned buildings—not the land—were developed by the Navy.

Mr. GAVIN. Let me ask you right at that point: What kind of a deal is that anyway? How did we ever get back on that kind of a deal?

Secretary BANTZ. That is what I wanted to explain.

Mr. GAVIN. If we build a plant on somebody else's land, how——

Secretary BANTZ. I will try to explain it to you.

Mr. GAVIN. Oh, all right.

Secretary BANTZ. It is a very complicated lease. I never read it over, I must be frank. They tell me this, that under the terms of the lease the Aerojet Corp. have a right if the Navy chooses, to buy that plant, on a stipulation that there is a floor based on the original cost to the Government, with the normal depreciation factors taken into consideration. That is the floor. That doesn't mean the Navy or the Government has to sell it to Aerojet at that price. The Navy has every right to bargain with them. But there is a floor set on it.

I also understand—as I say I never read the lease—that the Navy has the right, with certain stipulations, to buy the land that these buildings are on.

Mr. CUNNINGHAM. Which is common with long-term leases.

Secretary BANTZ. That is right.

Mr. HESS. Mr. Chairman——

Mr. HÉBERT. Mr. Hess——

Mr. HESS. Mr. Secretary, when was this plant built?

Secretary BANTZ. Admiral Raborn and Admiral Stroop can answer that. I can't.

Admiral STROOP. The initial investment was, I think, during World War II.

Mr. HESS. What purpose was it built for?

Admiral STROOP. It was built to produce these JATO's—jet-assisted takeoff rockets.

Mr. HESS. That is what it was built for?

Admiral STROOP. The Navy portion of it.

Mr. HESS. Yes.

Admiral STROOP. Yes, sir.

Mr. HESS. I understand Aerojet also has their own plant on their own ground.

Admiral STROOP. Yes, sir, that is right.

Mr. HESS. That is a change, I presume.

Admiral STROOP. That is right.

Mr. HESS. And the cost of the construction of the plant was $6 million, is that correct?

Admiral STROOP. That is right, sir.

Mr. HESS. It isn't a contract that was given to Aerojet?

Admiral STROOP. Oh, no.

Mr. HESS. All right.

Mr. GAVIN. Mr. Chairman——

Mr. HÉBERT. Yes.

Mr. GAVIN. I wonder if our general counsel could tell us something about Aerojet? The admiral refers to the Aerojet when it was formed and the Navy became associated with it, that they had some 600 scientists and to carry a load of 600 scientists it must have been a large corporation. What did they produce or what did they manufacture before the Navy got tied in with them on this proposal here, to carry such a group of scientists, 600 scientists. I was wondering.

Mr. HÉBERT. Admiral Raborn can answer that.

Admiral RABORN. May I amend my remarks?

Mr. GAVIN. Yes.

Admiral RABORN. Refreshing my memory, I find they had 497 or 500 in the year 1956 when the decision was made to go into the Navy owned plant there, operated by the Aerojet, for the Polaris motor.

Mr. GAVIN. What was Aerojet producing, to carry that number of scientists?

Admiral RABORN. Yes, sir. They were producing rocket motors for several of the smaller guided missiles, in addition to the JATO's for both the Air Force and the Navy.

This essentially is the answer. They were building rocket motors for smaller guided missiles.

Mr. GAVIN. Were those programs——

Admiral RABORN. They were developing them.

Mr. GAVIN. Yes. Were those programs financed by the Department of Defense—Navy or Air?

Admiral RABORN. Yes, sir.

Mr. GAVIN. They were all financed by them?

Admiral RABORN. Yes, sir. It is 100 percent Government work.

Mr. GAVIN. 100 percent Government.

Mr. COURTNEY. Work.

Mr. GAVIN. And I suppose it is 100 percent financed, and I suppose we made progress payments to them and we furnished the materials.

That is why I was wondering what did Aetrojet have in the way of a contribution to this overall picture, other than the scientic know-how? It was developed into a big corporation.

Mr. COURTNEY. Mr. Chairman——

Mr. GAVIN. Yes.

Mr. COURTNEY. I can answer Mr. Gavin's question briefly. It will be fully developed by Aerojet itself.

Mr. GAVIN. What?

Mr. COURTNEY. It will be developed by Aerojet itself fully, unless you want me to give you a thumbnail on it now.

Mr. GAVIN. I think we ought to have a thumbnail on it. Also this Thiokol comes in. Are they tied in with Aerojet?

Mr. COURTNEY. No.

Mr. GAVIN. Are they a part——

Admiral STROOP. They are competitors, sir.

Mr. GAVIN. Oh, they are competitors. I didn't know whether they were in there or not. Give us a sketch on that.

Mr. COURTNEY. Aerojet started at Azusa, Calif., some time back in 1940 or 1941, 1941 I think it was. It was formed by a group of scientists out of Cal Tech. They were formed for the production among other things of JATO. Some time in 1943, 88 percent of the stock was purchased by General Tire Co., and later the corporation became known as Aerojet General Corp., which is the present corporate name. And from Azusa the development has gone up for this particular purpose and for our present consideration to Sacramento, where this plant, the Navy plant that has been described here, which produced the JATO's was built, during World War II.

Admiral RABORN. Yes.

Mr. COURTNEY. And where the Navy produced or Aerojet General produced the JATO, among other things.

(Admiral Raborn nods.)

Mr. COURTNEY. And in addition to that, Aerojet General has at Sacramento other buildings and facilities of its own engaged in other types of work.

Mr. HÉBERT. Outside of Government?

Mr. COURTNEY. Relating, I would say, to this——

Mr. HÉBERT. Outside of Government?

Mr. COURTNEY. Yes, sir—no, I am sorry. I can't answer that question.

Mr. HÉBERT. Is it wholly Government?

Admiral RABORN. I would like to answer that, Mr. Chairman.

Mr. HÉBERT. Yes, sir.

Admiral RABORN. The Aerojet General plant has a total in this area composed of two major facilities.

Mr. HÉBERT. Now, do we get down to this accurately, now, that here is a situation where the Navy had a choice between two Government-owned facilities and elected to go to Sacramento?

Admiral RABORN. This is essentially correct, Mr. Chairman.

Mr. HÉBERT. Because that is important.

Admiral RABORN. Yes, sir.

Mr. HÉBERT. Very important.

Admiral RABORN. Yes, sir, these are the facts.

Mr. Lankford, you had a question?

Mr. LANKFORD. Well, Mr. Chairman, I wanted to ask Admiral Raborn, if I understood him correctly: This Aerojet plant was physically ready at the time you decided to embark on the Polaris program to produce the component parts of Polaris?

Admiral RABORN. It was physically ready to commence the initial work of the motor development and was relatively unoccupied. This saved us about 8 months to a year.

Mr. LANKFORD. There was no construction, no additions that had to be made.

Admiral RABORN. There were additions that had to be made, but they were incrementally added as the need for them arose, and the initial facilities gave us immediate start.

Mr. LANKFORD. Now, in reply to an inquiry that I directed to Secretary McElroy, which was answered by Mr. Holaday—I think you have my letter, John—Mr. Holaday said there was an investment, a total Navy investment as I recall of $10 million in Aerojet. That doesn't quite tie in with your figure of $18 million. Would that be the $10 million in addition to the original $6 million?

Admiral RABORN. Yes, sir. I think we have to take them in point of time. Mr. Holaday's letter at that time probably was correct. Since then we have added, based on the successes we have had there, based on the development of the Polaris motor, additional.

Mr. LANKFORD. You mean $8 million this last month?

Admiral RABORN. Not just this last month.

Mr. LANKFORD. This letter was written last month.

Admiral RABORN. I can't speak for the letter. I can give you the facts as I see them, sir.

Mr. LANKFORD. I was just trying to find out who was right, Mr. Holaday or you.

Admiral RABORN. With all due deference to Mr. Holaday, I think we are correct.

Mr. LANKFORD. Now, Admiral Stroop, you said there is a total investment of some $60 million, of which over $27 million have been expended since 1952.

(Admiral Stroop nods.)

Mr. LANKFORD. To modernize the factory and to introduce new processes for new weapons. What were the new processes and what new weapons? Are you speaking now of your double-base propellents and your Sidewinder, Talos, and Terrier?

Admiral STROOP. That is correct, sir.

The whole process of casting medium size grains, powder grains, propellent grains for missile and rocket application is included in this $27 million, and in addition to that we have a very modest additional increment going in for $150,000. That is underway now, to go into composite propellent. I believe you are aware of that.

Mr. LANKFORD. Yes, sir.

Now, at the time that this $27 million was expended, since 1952——

Admiral STROOP. That has been incremental, incidentally, over a number of years.

Mr. LANKFORD. Yes, sir, I realize that.

Admiral STROOP. And some of it has been in the public works area, quite significant amounts.

Mr. LANKFORD. There was in existence at that time a composite propellent; is that not true?

Admiral STROOP. Yes, sir.

Mr. LANKFORD. Was any thought given to putting in—and there also is in existence the double-base propellents.

Admiral STROOP. Double base have a much longer history, of course.

Mr. LANKFORD. And there are capabilities for producing those elsewhere?

Admiral STROOP. Yes, sir—oh, double base. Yes, sir; the Army had capabilities which we capitalized on.

Mr. LANKFORD. Was any thought given at that time to going into the composite field at Indian Head?

Admiral STROOP. No, sir. It did not appear a desirable thing to do.

This is a story of two types of propellents, one double-base and the center of knowledge and production was on the east coast here, in this area, and the composite propellent where the knowledge was centered at Aerojet and Thiokol.

Mr. LANKFORD. Thiokol is on the east coast, too, isn't it; in Alabama, is it not?

Admiral STROOP. Yes, and Elkton, Md., I believe.

Mr. LANKFORD. Elkton.

Admiral STROOP. The composite propellents are relatively new. Initially they were what you might term rather unsophisticated. They gave a lot of smoke. They were somewhat dirty and certainly were not applicable for gun applications and appeared undesirable for rocket applications.

The Government has continued to put money into research and development and these companies, particularly Aerojet, have put in some of their own money. And at the time that Admiral Raborn had to make his decision we were interested to find that the composite propellent got the nod. At that time they had a couple of advantages which influenced this decision. They could be loaded in somewhat greater density, that is you could get more propellent in the same package, and they had been cleaned up to the point where they would be useful in these applications, and they were among other things case bondable. That is, they could be melted and poured into the metal container which formed the outer casing of the motor. They had one other advantage. This development had brought them from a hard substance to a rubbery substance. And this is a part of the case bonding process. Because the metal motor will expand and contract and the propellent when it was developed into a rubbery substance would also expand and contract and the bond would remain good throughout the period of burning.

Mr. LANKFORD. Yes. But no thought was given to any research or production of composite propellents at Indian Head until last February; is that correct?

Admiral STROOP. That is correct, sir.

The knowledge and development was at Aerojet chiefly, in a Government-owned plant. It did not seem wise or necessary to bring this into Indian Head at that time.

Mr. LANKFORD. But composite propellant as early as I might say as 1952 was a fait accompli.

Admiral STROOP. Earlier than that, actually, sir. It was started very early in World War II.

Mr. LANKFORD. Yes. As I understand it, there are 2 major composite propellants—1 developed by Thiokol and 1 developed by Aerojet, which is actually sort of a first cousin of Thiokol.

Admiral RABORN. Yes.

Mr. LANKFORD. It is a little different from Thiokol, but the basic principles are the same; is that correct?

Admiral RABORN. Yes.

Mr. LANKFORD. And the basic ingredient is rubber, I mean synthetic rubber?

Admiral STROOP. Well, that is the matrix, I guess.

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Mr. LANKFORD. Isn't that what sort of led Thiokol into the production of a composite propellant?

Admiral STROOP. Yes, sir.

Mr. LANKFORD. I understand there are other matrices, if you want to call them that, that can be used or it is thought can be used in composite propellants. Is this true?

Admiral STROOP. Yes, sir. We have a backup witness here that can give you technical details if you want to. But the answer to that question is yes.

Mr. LANKFORD. I have no technical knowledge of this. It is just what I have been told.

I was wondering if any thought had been given to looking into the use of other materials than synthetic rubbers in the manufacture of composite propellants?

Admiral STROOP. I am sure it has been, sir. This is a very active field.

Mr. LANKFORD. This has not been done at Indian Head, though.

Admiral STROOP. I don't believe—not to my knowledge; no, sir. We have some exploratory research authorized down there, but this is rather minor. And most of their work is in the field of double-base propellants.

Mr. LANKFORD. What it actually boils down to is that despite the expenditure of $27 million since 1952, in increments, that it was expended really for the production of what might be called conventional propellants, more nearly conventional propellants.

Admiral STROOP. That is not entirely correct, sir, because these double-base propellants are being used to a considerable degree in the smaller motors, for smaller types of missiles and rockets. And I might point out—I have alluded in my statement to it. This, of course, borders on classified information, which we will give the committee if you would like in executive session.

The future is bright for this particular system. It is being pursued very actively at two different places. Admiral Raborn, I might add, is watching it very carefully.

Admiral RABORN. I might interject, sir. I might turn out to be your best friend. [Laughter.]

Mr. LANKFORD. Mr. Chairman, if I may, I would like to make this statement. Initially, this came to my attention because of layoffs at Indian Head and naturally I was upset about it. But I think it has gone beyond Indian Head and I am interested in the overall picture. Naturally, I am interested in my constituents and I want them all to have jobs. But I am using Indian Head simply as an example because it is what I know.

Mr. HÉBERT. Admiral, the statement that you just made: I think it would be very pertinent in the record to establish one thing. I think your previous testimony before the full committee some time ago established the fact that you are the one responsible head for the program as far as the Navy is concerned in the development of the Polaris missile program?

Admiral RABORN. I have total responsibility.

Mr. HÉBERT. You have total responsibility?

Admiral RABORN. Yes, sir.

Mr. HÉBERT. And having total responsibility you are the one individual who makes the decisions?

Admiral RABORN. I make the decisions; yes, sir.

Mr. HÉBERT. Mr. Hardy, you have some questions?

Mr. HARDY. I wanted to get back, Mr. Chairman, to the question you raised. I don't think it was completed.

Awhile ago we were discussing the plant facilities of Aerojet. As I understand, I believe we got started on a discussion of the expansion program which I understood was an $18 million program over a 3-year period? Is that correct, on the Navy expansion?

Admiral STROOP. That is approximately correct for the Sacramento facility and for special project alone.

The total figure which I have here—and I would like to confirm this with our real-estate people—was 21.4 million at Sacramento and other expansions for other purposes, chiefly this JATO application, 2.4.

Mr. HARDY. Now, all of that is at the Aerojet plant?

Admiral STROOP. Sir?

Mr. HARDY. All of that is in connection with the Aerojet activities?

Admiral STROOP. Yes, sir; that is right, at both Azusa and Sacramento, the majority being at Sacramento.

Mr. HARDY. Well, I am a little concerned about the fact that we have such an establishment on rented land. The experience that we have encountered generally on the real estate subcommittee has not seemed to indicate that Uncle Sam came out very well ultimately in building facilities on somebody else's land.

I don't know how we got into this to start with. And I don't recall having been aware of the situation when the matter of increasing these facilities was presented to the committee in connection with its construction bill. I presume it was included in a public works bill.

Admiral RABORN. May I take that question?

Mr. HARDY. Anybody that can answer it. Yes, Admiral.

Admiral RABORN. We are not allowed to build Government facilities on privately owned land, but we are permitted, by law, to build them on privately owned land if they are deeded to the Government with the right to buy.

Now, this is legal and is the—in other words, this is Government-owned land for our control. The physical transfer has not been made.

Mr. HARDY. Admiral, I am not questioning its legality. But the experience that we have had with scrambled facilities has all been sour. I say all. I can't think of one of them at the moment that hasn't been sour.

And I am a little bit disturbed to observe that we are apparently continuing on a program of building facilities on land that belongs to somebody else when we are limiting possible resale of that plant, eventual resale of it, to one customer.

Now, that is actually what we are doing.

Secretary BANTZ. Mr. Hardy, may I answer that? I think in many instances that would be right. I think in some of these scrambled facilities where we have just exactly a scrambled facility intermingled with corporation-owned properties, that is right.

I have never seen this plant at Sacramento. But it is my understanding that it is completely isolated to the degree that it could be sold as a separate entity.

Mr. HARDY. Well, even so, Mr. Bantz, have you ever observed one that we sold, that Uncle Sam sold to advantage, even when it could be separated?

Secretary BANTZ. The facts of the matter are that most of the plants you are talking about are old and antiquated and have been declared surplus for that reason.

Mr. HARDY. I am not talking necessarily about them being old. As a matter of fact, there is one Navy scrambled facility that is currently up for disposal.

Secretary BANTZ. We have some of them, there is no question about it.

Mr. HARDY. It isn't antiquated by any means. But it is right square in the middle of somebody else's property.

When we get to building this type of thing, frankly, I am skeptical about it. I must confess this one got by me when it was considered by the committee in the construction bill, because I don't recall ever having been aware of this situation.

Frankly, I want to find out a little more about it and I intend to do it before we get through with it.

Now, one other thing.

Do I understand that that total Aerojet facility is engaged solely in governmental work? Can any of you answer that?

Admiral RABORN. It is.

Admiral STROOP. I am not aware of any private contracts, sir.

Mr. HARDY. Then the Aerojet was organized and originally for governmental work, I take it?

Admiral STROOP. Yes, sir.

Mr. HARDY. So that all of the facilities have substantially been built for governmental performance, if not with governmental financing?

Admiral RABORN. That is correct.

Admiral STROOP. Aerojet——

Mr. HARDY. The Government has paid for them one way or another, either directly or indirectly, or will pay for them, and it will have to, otherwise the company couldn't get into that kind of business.

Admiral STROOP. That is right.

Mr. BANTZ. That is right.

Mr. HARDY. That is all, Mr. Chairman.

Mr. HÉBERT. Mr. Cunningham——

Mr. CUNNINGHAM. Thank you, Mr. Chairman.

Admiral, some minutes ago I understood you to say that Indian Head is the only place where a propellent for a particular kind of guided missile can be made, is that right?

Admiral STROOP. It is the only place where it is being made, sir. It isn't the only place where it can be made.

Mr. CUNNINGHAM. That is the only place it is being made. Is there any other place in the United States that it could be made soon, and I don't ask you to tell me where.

Admiral STROOP. The Army has three arsenals, sir, at least three, to my knowledge, that have capabilities along these lines.

Mr. CUNNINGHAM. Well, my concern is simply this. Supposing that Indian Head was blown up, destroyed in some manner. Then that would put one particular missile out of business for the future, because there would be no propellent for it.

Admiral STROOP. Only until we could shift operations to one of these other arsenals.

Mr. CUNNINGHAM. How long would that take?

Admiral STROOP. It would depend upon the missile and the size of it, sir. Anywhere from six months to maybe a year.

Mr. CUNNINGHAM. That is all, Mr. Chairman.

Mr. HÉBERT. Mr. Bates——

Mr. BATES. Admiral Raborn, you indicated that from the point of view of know-how there was no question that Aerojet had superior personnel experience contrasted with Indian Head, is that correct?

Admiral RABORN. That is correct, sir.

Mr. BATES. Now, in the event that you went ahead at Indian Head when this determination was made, how much time would you think you would have lost in the process of developing this at this time?

Admiral RABORN. This question has to revolve around two major factors, Mr. Bates. One is personnel in adequate numbers and stature to take on a major development job in the world's largest solid propellent motor, something that had never been done before. That is rather an intangible one and it would involve hiring away from other companies this kind of talent, and getting them moved and settled in the area that you wish them to work, as well as to organize them as a team and fit them in with the existing talent at the powder factory, which I don't mean to depreciate one small whit. They are a very fine group of highly talented people.

The other factor involved in this question is the provision of facilities that are peculiar to the composite research and development and production program for motors.

This can be done incrementally, of course, as you get into it and as you prove out the propellent you will add to it various facilities to allow you to expand and capitalize on your research results. That would take, starting out fresh, at least a year to a year and a half even by people who are completely familiar with the needs for a major development program in the composite field.

I say this because I have had experience in which the Thiokol Chemical Corp. has made a formal proposal to me to go into a various area, another part of the United States, to do just such a job. And this is the kind of results they came up with, and an expenditure of some $25 million and about a year and a half time before they could put it into operation. And this is with a company that is rather large and has an inherent, large quantity of trained personnel, scientists and so forth, who know precisely what they want and where they want it and the particular needs of this propellent.

Does that answer your question, Mr. Bates?

Mr. BATES. You would lose a year and a half, would you say?

Admiral RABORN. At least a year and a half, and I think the intangible thing is getting together a sufficiently large enough technical team. I have no feeling for that. But I would expect it would be quite a tremendous task and the expenditure of large sums of money.

Mr. BATES. Now, from the point of view of facilities, would it have cost you more at Indian Head than it does at Sacramento, I mean it has at Sacramento?

Admiral RABORN. Yes, sir; for two reasons. One, we have there deeded to the Government and the right to buy large areas of waste-

land from the Sacramento River, which is ideally suited because of the alluvial deposits, large mounds, and so forth, for solid propellent research and development activities.

The area we have there is roughly 4 miles by 4 miles, with easements outside for danger zones. When you have large amounts of this propellent being mixed, as we do for this Polaris motor, you have a severe hazard—explosive hazard. When you look at the space requirements and compare that with what is available at the powder factory, you see that the space down there is very small and would be restricted and the production—the construction would require erection of bunkers, revetments, and so forth which are provided naturally in the Sacramento River bed by the unusual configuration of that land.

Mr. BATES. Would the cost be about the same for the facilities and for the buildings?

Admiral RABORN. No, sir. It would be, I would say, comparable—if you could put them in the rather small area at the powder factory, it would run, because of the necessity to build these bunkers, around 25 to 30 percent more depending on the nature of the bunkers, whether they are concrete or earth mound.

Mr. BATES. Now, this is a development contract, it is not a production contract; is that correct?

Admiral RABORN. Initially it is a research and development contract, with the production facilities. We have utilized those same facilities, augmented, to provide the production.

Mr. BATES. Ultimately Aerojet will get a production contract; is that correct?

Admiral RABORN. Yes, sir. It will be the only place where we can manufacture motors of this size.

Mr. BATES. So they produce both the motors and the composite; is that correct?

Admiral RABORN. Well, the motors are composite propellant—are made of composite propellant.

Admiral RABORN. I beg your pardon, sir, I may have misunderstood you.

Mr. BATES. Now, when you refer to the motor, what do you refer to?

Admiral RABORN. The complete motor consists, of course, of the propellant, which is developed by the Aerojet General Corp., the container which can be one of several types—and for security reasons I won't mention them here—together with flight control surfaces that will give you precision flight control in the area.

The very large motor which we have for the Polaris brings many complicated problems of putting these 3 or 4 elements together, which we have never before faced and which when we started out we did not know how to do.

It was necessary, then, that this one team take over the research in putting it together as a package, because they are so intimate, one element of the motor to the other.

Formerly, as Admiral Stroop has testified, for example, you could build a motor case, a metal case, and you could build a grain some place else and put the two together, very much like a flint in a cigarette lighter, and it worked very well. But this was not at all suitable for the very large motors and you had to have closer intimacy and closer tolerances and closer correlated performance.

Mr. BATES. Well, does Aerojet——

Admiral RABORN. So Aerojet, while they do not manufacture productionwise—that is, production quantities of the metal parts—they do have adequate facilities there to tie the propellant and the metal parts together and to test them out to do the research and development work.

Mr. BATES. I see. So that in the event of a future contract for production, they would probably farm out the metal aspects of it?

Admiral RABORN. Yes, sir. To whatever capability they have, they will be in direct competition with others. This is very clearly understood.

Admiral STROOP. Could I make one point here, sir? I tried to make it in my statement.

The research and development phases of these large motors being produced requires significant quantities of the motor. The long-term usage of them will not require maybe as much. In other words, during the development phase you have to fire quite a good many, and this is very costly. Once you get this particular product developed, it is not like the old conventional types of ammunition where you had large quantities for target practice, or even in wartime when you had to fire large quantities.

In service use we won't require nearly the same ratio that we have in the past.

Mr. BATES. I understand that.

Admiral RABORN. May I add additionally to this, sir——

Mr. HÉBERT. Mr. Rivers——

Admiral RABORN. May I add just one remark to finish this idea or possibly round it out a little more?

Mr. HÉBERT. Yes.

Admiral RABORN. For this reason: Our facilities at the Navy-owned plant at Aerojet have been rather modest and just adequate to support the research and development program and to provide the ship-fills of missiles through the forthcoming years.

Mr. BATES. That is all.

Mr. HÉBERT. Mr. Rivers.

Mr. RIVERS. You may answer, either Admiral Stroop or Admiral Raborn, who does pretty well in his own right. We who were here during the war remember the JATO. I think it helped Doolittle a little bit in his raid on Tokyo?

Admiral RABORN. Yes, sir.

Admiral STROOP. Yes, sir.

Mr. RIVERS. That is one of the great things that happened in World War II. That is like the proximity fuse, which the Navy, too, developed. It sailed the Air Force over Europe, of course, as you know. It sailed the Navy over the Pacific.

Now did the fine work which Aerojet did on JATO give you a taking-off place to begin your thinking on Polaris?

Admiral STROOP. Essentially that is right, sir.

Mr. RIVERS. Did you recoup any of the facilities which we built then for JATO?

Admiral STROOP. Oh, yes, sir; that $6 million plant is being used, because it produces the propellent, you see.

Mr. RIVERS. Maybe you are repeating some of what you have already said, but I have Goldfine constituents, too, and I have been trying to get to this room since 10 o'clock.

Now, has your development in Polaris exceeded expectations?

Admiral STROOP. The time scale; yes, sir. Admiral Raborn can field that one, I think, a little better.

Mr. RIVERS. Which, of course, justifies your construction of a base; doesn't it?

Admiral RABORN. It certainly justifies the decision of going into this plant.

Mr. RIVERS. Somewhere in the central part of the United States, south of North Carolina.

Mr. BATES. North of Georgia.

Mr. RIVERS. So you can see now beyond the research and development?

Admiral RABORN. Yes, sir.

Mr. RIVERS. You can?

Admiral RABORN. Yes, sir.

Mr. RIVERS. You can see, now, the production capabilities?

Admiral RABORN. Yes, sir.

Mr. RIVERS. Would you "guesstimate" the number of months when there may be the possibility of some consideration for the award and production, or is that classified?

Admiral RABORN. I am afraid it borders on classification, sir.

Mr. RIVERS. I see. Let me ask you this. This is a solid propellent?

Admiral STROOP. Yes, sir; that is correct.

Admiral RABORN. Yes, sir.

Mr. RIVERS. Can you control a solid propellent at this time, or is that classified?

Admiral STROOP. Admiral Raborn's very competent group has developed a scheme for doing this; yes, sir.

Mr. RIVERS. Can you see beyond the research and development in that?

Admiral STROOP. Yes, sir.

Mr. RIVERS. The construction of bases is needed now to fulfill those capabilities, in your opinion?

Admiral RABORN. Yes, sir. We are engaged in that.

Mr. RIVERS. Yes. Taking a given location—and I am not provincial, as you understand. At a given location, if you were a contractor, does the Navy give the contractor the go-ahead to construct this thing under a crash setup, or, say, have it completed in a given number of months and so forth? The Yards and Docks gets it directly from you, though.

Admiral RABORN. May I just speak to that for the Polaris program alone, Mr. Rivers? The Polaris program has been given by the President coequal top priority in the national effort.

Mr. RIVERS. That is right.

Admiral RABORN. And because of this, all of us, including our contractors, are motivated to get the job done just a little faster than we normally would.

Mr. RIVERS. As soon as the drawings are completed, you want the bases constructed.

Admiral RABORN. We are cutting corners for time everywhere we can and yet are keeping the program in balance.

Mr. RIVERS. I see.

Admiral RABORN. In concert.

Mr. RIVERS. I see.

Admiral RABORN. So we are walking forward together on all phases of this entire weapons system.

Mr. RIVERS. You haven't changed your mind as to the location of any base I have in mind, have you?

Admiral RABORN. No, sir.

Mr. HÉBERT. Mr. Gavin.

Mr. GAVIN. Admiral Stroop, I note here on page 4 you say:

The Aerojet Corp. was formed in 1942 to exploit this propellent for jet-assisted takeoff applications.

May I ask you when Aerojet Corp. was taken over by General Tire; what year?

Admiral STROOP. When the Aerojet Corp. was formed, that was done at the time with General Tire money, as I understand it.

Mr. GAVIN. Well, what year was it?

Admiral STROOP. That was 1942.

Mr. GAVIN. What?

Admiral STROOP. 1942.

Mr. GAVIN. Was it taken over by General Tire in 1942?

Admiral STROOP. I think it was formed.

Mr. GAVIN. It was formed in 1942. But when was it taken over by General Tire?

Admiral STROOP. I will have——

Mr. GAVIN. I don't think until the last several years.

Admiral STROOP. I will have to supply that for the record, sir. At the moment, General Tire has about 80 percent of the stock.

Mr. GAVIN. That may be, but I am asking when it was taken over. And you are going to supply it for the record?

Admiral STROOP. Yes, sir.

Mr. GAVIN. And then, again on page 9, you say:

The decision to go to Aerojet for the Polaris motor was sound and was the only practical one in view of the time available for the development. Here in an existing Government plant, staffed with competent scientists and engineers, the maximum progress could be made, and, in fact, no other course of action was acceptable or practical.

When did you reach that decision?

Admiral STROOP. That was a little over 2 years ago—almost 3 years ago.

Mr. GAVIN. Two years—three?

Admiral STROOP. Three years ago, sir.

Mr. GAVIN. All right. What I was trying to find out was when General Tire took over Aerojet.

Admiral STROOP. It was before that time.

Mr. GAVIN. What?

Admiral STROOP. Before that time by many, many years, sir.

Mr. GAVIN. Well, give us that information.

Admiral STROOP. Yes, sir.

Mr. GAVIN. Will you?

Mr. General Counsel, would you follow through and give me that information, please?

Mr. COURTNEY. We will get that information.
Mr. RIVERS. Immediately.
Mr. HÉBERT. Are you finished?
Mr. GAVIN. Yes, sir.
Mr. HÉBERT. Mr. Miller.
Mr. MILLER. Admiral Raborn, I just want to confirm my own thinking and deductions I drew from what you said. Is this correct, that one of the reasons you went to Aerojet is that you had a good team of scientists, the only ones skilled in this particular field at the time?
Admiral RABORN. That is correct, sir.
Mr. MILLER. And that, because of the facilities, they were the best available at the time, and that by selecting Aerojet you not only could get along with the job but saved about a year and a half that would be required in putting together a team of scientists and getting facilities constructed and the show on the road; is that correct?
Admiral RABORN. I think a year and a half to put together a going team someplace else is a very conservative estimate. It would take a year and a half to construct the facilities alone. I would say that, to get together a team of comparable research talent and capable of taking on a very large development program—that is a very nebulous thing and depends entirely on how much money you have to hire away the talent, because it is limited. You have to hire it away from other people.
Mr. MILLER. And, in this particular field at this particular time, time is of the essence, if that statement is ever correct; isn't that true?
Admiral RABORN. I certainly have been impressed with that factor in this program, sir.
Mr. RIVERS. Are all those scientists Californians?
Admiral RABORN. No. The powder plant has a very fine number of skilled scientists. I am very happy to say that.
Mr. MILLER. They are just intelligent people who have migrated to California.
Mr. HÉBERT. Mr. Courtney.
Mr. COURTNEY. I have two questions of Admiral Stroop, I believe, who can respond to them. In the course of your statement, Admiral, at the bottom of page 5 and the beginning of page 6, the first two lines, you refer to the proposed utilization of Indian Head or suggested use of Indian Head for a propellent to be manufactured there and used in the second stage.
Admiral STROOP. Yes, sir.
Mr. COURTNEY. Polaris.
Admiral STROOP. Yes, sir.
Mr. COURTNEY. That is assuming the development proves.
Now, there has come to the attention of the commitee a letter which you addressed to Senator Byrd of Virginia in response to an inquiry of his, dated March 18, 1958, which, Mr. Chairman, is a part of the records of this committee.
I would like to refer to a statement in it and ask for a clarification of it, to avoid any possible confusion.
Without reading the whole letter, you were discussing, in response to Senator Byrd, the potential, if you please, of Indian Head and you make this statement:

The propulsion units referred to above are solid propellents—

referring to the present utilization of Indian Head.

However, they are not the same type of solid propellents as those used in the Polaris missile. Approximately 2 years ago when the technical feasibility of developing a solid propulsion system for Polaris was determined, the only proven propellent system that could do the job was a composite type propellent which was case bondable. The facilities and technical know-how for this type of system did not then and does not now exist at the powder factory. It was determined to be most advantageous to the Navy to do this development at the Navy-owned facilities of the Aerojet Corp.

(The full letter is as follows:)

DEPARTMENT OF THE NAVY,
BUREAU OF ORDNANCE,
Washington, D. C., March 18, 1958.

Hon. HARRY F. BYRD,
United States Senate, Washington, D. C.

MY DEAR SENATOR BYRD: The Naval Liaison Office has forwarded to the Bureau of Ordnance for reply a memorandum dated February 28, 1958, from Mr. M. J. Menefee of your staff, concerning the Naval Powder Factory, Indian Head, Md.

Due to the continuing reduction in requirements for conventional weapons and the necessity to utilize available funds, insofar as practicable, in support of high priority programs for new types of weapons, it has been necessary to effect substantial reductions in employment at the Naval Powder Factory, as well as at other naval ordnance facilities.

The Navy has a substantial financial investment in the Naval Powder Factory and every effort has been made to assign the maximum amount of work there within the capabilities of its facilities. In addition, from fiscal year 1952 to fiscal year 1958, the Navy has expended approximately $27 million for new construction and $1,500,000 for repairs and improvements at the Naval Powder Factory, in order to meet the requirements motivated by the advances in weapon propellent technology. These have included a new cast propellent plant, a nitroglycerin plant, a nitroguanidine plant, research and development facilities and a triple-base powder line. Because of these new facilities the Naval Powder Factory has the capability for and is now the sole source for producing propulsion units for Terrier, Talos, and a number of other missile and new weapon projects.

I should like to mention also that the tonnage and dollar values for guided missile propulsion and warhead units are low compared with the huge requirements for conventional propellents and explosives in past years. In the new weapons systems expenditures are made predominantly in the electronics industry (1) for the missile, (2) for the fire control and guidance systems, and (3) for the missile launchers, while expenditures for explosives ade relatively small. With conventional weapons, the number of hits and lethality of hits were both small. With the new weapons, both the percentage of hits and lethality of hits are high. These facts result in a relatively small number of missiles of high lethality and high cost replacing huge stocks of relatively inexpensive conventional weapons. The major expenditures in the new weapons systems are primarily in the electronics industry in lieu of the explosives industry. Because of this fact, the Naval Powder Factory must suffer cutbacks in spite of the fact that the Powder Factory is producing all the propellent propulsion units for Terrier, Talos, Sidewinder and other new weapons.

The propulsion units referred to above are solid propellents; however, they are not the same type of solid propellents as those used in the Polaris missile. Approximately 2 years ago, when the technical feasibility of developing a solid propulsion system for Polaris was determined the only proven propellent system that could do the job was a composite type propellent which was case bondable. The facilities and technical know-how for this type of system did not then and do not now exist at the Powder Factory. It was determined to be most advantageous to the Navy to do this development at the Navy-owned facilities of the Aerojet Corp.

It has been reported in the newspapers that for $150,000 the Naval Powder Factory could be tooled up to produce the Polaris propellent. Certain modifica-

tions costing approximately $150,000 are to be made to provide the Naval Powder Factory with a limited capacity for the manufacture of composite-type propellents. However, this would only provide facilities for the production of small propellent grains as an exploratory program and will not enable the Powder Factory to manufacture composite propellents for the Polaris system.

The Navy realizes fully the impact personnel reductions have on loyal employees and is making every effort to assist them in finding other jobs. An active outplacement program is in effect at the Naval Powder Factory. As part of this program, the Powder Factory has contacted other Government agencies and industrial concerns in this area to learn of existing vacancies, and has enlisted the assistance of the Civil Service Commission and the United States Employment Service in finding other jobs for separated employees.

It is hoped that the information furnished herein will be helpful to you.

Sincerely yours,

PAUL D. STROOP,
Rear Admiral, United States Navy,
Chief, Bureau of Ordnance.

Mr. COURTNEY. Now, Admiral, in view of the statement appearing, which I have just referred to, in your statement this morning, and this statement of March 18, what are we to understand as to the capabilities for know-how in this field of the solid propellents, composite propellents, at Indian Head?

Admiral STROOP. Indian Head has not worked to my knowledge in the area of composite propellents. We are interested in getting Indian Head into it in a modest way and have underway now a line being established for about $150,000 total investment.

Mr. COURTNEY. Well, if you were getting into the field at Indian Head, are you doing it upon the basis not only of the facility available there but also upon the basis of the know-how available there?

Admiral STROOP. We will probably have to develop know-how, sir. But what we are going to start with is a production facility and not a research and development facility. And what we propose to do is produce about 80,000 pounds of propellents a month, which is about one-third of the Navy's needs for JATO.

In other words, some of the work which has been done at Aerojet in the past will probably now—will in fact now go to Indian Head, when this facility is working, about the 1st of January.

Mr. COURTNEY. Yes. But I am addressing myself to the question of the second stage of Polaris. The JATO fuel is not quite the same, is it, as the Polaris second stage fuel?

Admiral STROOP. No.

Mr. COURTNEY. And the question which you answered to Senator Byrd had to do with the second stage, the second stage propellant for Polaris, which in your letter to Senator Byrd you stated would be developed or would be carried on at Indian Head, to some extent.

Admiral STROOP. This was——

Mr. COURTNEY. Please. Let me finish the question.

Admiral STROOP. Yes, sir.

Mr. COURTNEY. I am just trying to clear up. Whereas on the 18th of March you indicated that there was not sufficient know-how at Indian Head.

Now, when has that know-how been developed between March 18 and the present time and how has it been developed, if you propose to use Indian Head?

Admiral STROOP. When we talk about using Indian Head—and this is bordering on classified material—for the second stage of Polaris, we are talking about another approach which will use double-

base propellant and not this rather very modest facility for composite propellant. There is no intention of building large composite propellant motors at Indian Head immediately.

Mr. COURTNEY. Well, the question is on your answer to Senator Byrd about the know-how which you have at Indian Head and reconciling that with the statements which you have made to this subcommittee this morning. How do we in these circumstances modify or change or explain the statement in your letter of March 18? That is the only question.

Admiral STROOP. The letter of March 18 referred to composite propellants and not to double-base.

Mr. COURTNEY. And not to double-base.

Admiral STROOP. That is right.

Mr. COURTNEY. You do believe that now there is at Indian Head sufficient technical know-how upon which you could build or into which you could build a composite fuel propellant program?

Admiral STROOP. This is only a modest manufacturing program, not a research and development program.

Mr. COURTNEY. For research and development?

Admiral STROOP. That is right. And you can establish a manufacturing program at any one of a number of places if the process is already developed. It is merely a matter of putting in the machinery and putting in some intelligent people to mix the material and form it.

Mr. COURTNEY. Then what you had reference to in answer to Senator Byrd was the development program as distinguished from the production program.

Admiral STROOP. Of composite propellants.

Mr. COURTNEY. Of composite propellants.

Admiral STROOP. That is correct.

Mr. COURTNEY. Of the type which you were referring to in this letter.

Admiral STROOP. Yes, sir.

Mr. COURTNEY. That is the clarification of the letter of March 18, which is in the committee's files, and your present statement?

Admiral STROOP. That is right.

Mr. COURTNEY. Now, in summary No. C, and with the clarification made by Admiral Raborn, you say here:

> To provide a Polaris composite capability would require extensive conversion of existing cast propellant facilities now used for other essential missile programs and earmarked for full production on mobilization, or the costly construction of completely new facilities.

Now, are the facilities which you will require for Admiral Raborn's program in existence now at some place which you can identify, or are they to be built in order to keep up with your program, and what will be the cost?

Admiral STROOP. They are in the process of being built. I will refer the cost to Admiral Raborn.

Admiral RABORN. I will answer that question this way, sir.

The facilities are existing in part and in sufficient quantity to keep pace with the research and development program.

We will have a certain capability of a certain number of motors, complete motors per month when the fiscal 1958 construction program is completed, in the very near future. We have additional facilities

going in in the fiscal year 1959 program to augment the numbers of motors being turned out for development and flight-test program.

So we have a basic capability for a certain number of motors per month. The number is classified. And we are adding to it to increase as the needs of the program requires for getting into flight testing.

Mr. COURTNEY. Then are we to understand, also, in answer to another question—I think, Admiral, probably this is implicit in what you said, but we would like to have it spelled out for the record.

(Admiral Raborn nods.)

Mr. COURTNEY. That the production program in quantity—if your answer was interpreted correctly by me—will be less in number than the requirements for your test and development program.

Admiral RABORN. At a point in time. This point in time is, I believe, 5 or 6, maybe 7 years down the road, when the submarine construction program, whatever it is going to be, is finished. Until that time, these facilities have been very carefully limited to that required for the development program plus providing motors for missiles for ship fills for submarines under construction.

Mr. COURTNEY. So that the production program is essentially one of diminishing proportions, is that right, at some point?

Admiral RABORN. At some point.

Mr. COURTNEY. Now, in the course of your answer you have indicated that the facilities developed by Aerojet, or I suggest you may have indicated that the facilities there, the know-how and the development which has gone on, would necessarily limit the production contract, or would it, to the Aerojet Corp. as a sole source?

Admiral RABORN. The answer to that is that it will limit in part to the Navy plant run by the Aerojet General Corp. because there we have the know-how and the necessary facilities to bring together the elements of the completed motor. The metal parts and other ancillary equipment will be provided, of course, by other contractors.

Mr. COURTNEY. Well, that is the fact now, is it not?

Admiral RABORN. That is the fact now.

Mr. COURTNEY. That some elements of the total composite are manufactured elsewhere?

Admiral RABORN. Yes, sir.

Mr. COURTNEY. Developed and manufactured elsewhere.

Admiral RABORN. Yes, sir.

Mr. COURTNEY. Those were the questions that I had, Mr. Chairman.

Mr. HÉBERT. Mr. Lankford——

Mr. LANKFORD. Mr. Chairman.

Admiral I would like to get away from Polaris for a few minutes and ask some general questions. Is the Navy in the process now or is it contemplating building additional facilities for propellent manufacture in conjunction with the Astrodyne Co. in New Mexico?

Admiral STROOP. No, sir.

Mr. LANKFORD. It is not?

Admiral STROOP. Not to my knowledge, and I think I would know about it.

Mr. LANKFORD. We hope so.

Is it contemplated to put in—as I understand it, Naval test station at Inyokern is the proper name for it.

Admiral STROOP. The name is China Lake.

Mr. LANKFORD. China Lake. That is a test station and not a production facility.

Admiral STROOP. It is not a production facility. It is test and development.

Mr. LANKFORD. Test and development.

Admiral STROOP. Research test and development.

Mr. LANKFORD. Is it contemplated to put in there a composite propellent production line similar to the one at Indian Head?

Admiral STROOP. Not certainly on a large scale. They may be doing some laboratory testing work in this area, but I have no plans for——

Mr. LANKFORD. Not like the production line that is at Indian Head.

Admiral STROOP. No, sir.

Mr. LANKFORD. That is all, Mr. Chairman.

Mr. HÉBERT. Any questions, Mr. Hardy?

Mr. HARDY. No.

Mr. HÉBERT. Mr. Gavin?

Mr. GAVIN. No questions.

Mr. HÉBERT. Mr. Hess?

Mr. HESS. No.

Mr. HÉBERT. No further questions, Mr. Courtney?

Mr. COURTNEY. I think not, Mr. Chairman. I think there is only one bit of information to be supplied for the record. I believe it will be supplied, Admiral, by the Aerojet people.

Admiral STROOP. 1944 was the date.

Mr. HÉBERT. Now, in summation, may I ask this question——

Mr. GAVIN. What was that?

Admiral STROOP. In 1944 Aerojet was absorbed or taken over—joined with General Tire & Rubber.

Mr. GAVIN. 1944.

Admiral STROOP. Before that it was a separate corporation—you were right, sir—called the Aerojet Corporation. This corporation was developed to exploit the processes which the jet propulsion laboratory of the California Institute of Technology had brought out.

Mr. HÉBERT. Mr. Hardy, you have another question?

Mr. HARDY. Yes, Mr. Chairman.

The current construction program and program for increasing facilities: What part of that is production facilities? I am talking now about at Aerojet.

Admiral RABORN. I have to take a point in time, Mr. Hardy, to associate——

Mr. HARDY. All right.

The reason I am asking the question is simply this. A moment ago I understood that the discussion indicated that insofar as production is concerned that could be carried on somewhere else just as well as it could be at Aerojet. I am just wondering if a major part of it is for construction facilities. You have a good many ordnance facilities Navy-owned scattered around in other areas. I am just wondering why we are spending a lot of money building new facilities on somebody else's land to go into the production business.

Admiral RABORN. May I answer that in reverse, sir. This land has been deeded to the Government with the right to buy.

Mr. HARDY. Well, I am not interested in these technicalities, of going into these leases.

Admiral RABORN. Yes, sir.

Mr. HARDY. Every time we go into any of them we get stuck, and we will get stuck on this one before you get through with it.

If you can show me one, Admiral. I don't know where it is.

Admiral RABORN. Aerojet is a fine example.

Mr. HARDY. But we won't find out before many years. It will be some years before we know how much we sunk in it and how much we lost, because we didn't provide for a proper basis of competitive resale.

Now, I would like to get back to where we were and if I can find out how much of the current program for increasing facilities is for increasing production facilities at Aerojet.

Admiral RABORN. I will have to give you this in percentage, if I may, on account of the actual figures being classified.

Mr. HARDY. That is all right.

Admiral RABORN. I appreciate that.

Mr. HARDY. I just want—actually I would like to know percentage-wise because——

Admiral RABORN. Yes, sir.

The current program which we are just completing is the fiscal year 1958 program and gives us, well, a good basis on which to give reliability to the quality of the missile which we have researched and developed.

In other words, we might say up until the greater portion or all of the facilities that we have put into the naval industrial reserve ordnance plant at Sacramento, as a sufficient title, have been to date through fiscal year 1958 research and development.

There is about—if I may refresh my memory just for a second, sir, I could give you a more accurate answer.

In fiscal year 1959 there is about 20 percent research and development—and this is just an estimate.

Mr. HARDY. And about 80 percent production.

Admiral RABORN. And 80 percent to augment existing capacity by addition of additional casting lines, casting pits.

Mr. HARDY. Mr. Chairman, there is just exactly the thing I was wondering about. I think that none of us—certainly I was not aware of it previously. And maybe some of the rest of us were. Here we are spending 80 percent of our facilities for production facilities—80 percent of our facilities funds for production, increasing the production capabilities, at a Government-owned plant, on somebody else's land, when you have Government-owned facilities and employees engaged in ordnance work that have the capability of being adapted to production that are going to be closed down in other areas.

Frankly, Mr. Chairman, I think that is the kind of thing that the Navy ought to look at very carefully, because you are inevitably going to be in the position of wasting manpower and you are going to be in the position of wasting our physical assets, when we get to a point of changing to some other type of propellent or to some other use. Because the facilities are not going to be of any value to the United States and you are going to have only one person who will buy them and that is the person who owns the land that this is on.

Mr. GAVIN. May I ask a question, Mr. Chairman?

Mr. HÉBERT. Let the Admiral answer that.

Admiral RABORN. May I comment on that, sir?

First, let me say that the situation is not quite as black as that, from my personal knowledge of the facts.

Mr. HARDY. I realize that, Admiral, because otherwise you wouldn't have made that decision.

Admiral RABORN. Yes, sir. This is based on personal observation of true facts. My comments are based on a very close technical association with the facts in the case. And I am just delighted to have this opportunity to speak to this point.

We are still in a development program. We have not developed the final motor and we won't for several years to come because there is an incremental development. We go so far, we do so well, and this is good. We have done very well to date. But I would not like to leave the impression that the 80 percent capability, which is small, relatively, moneywise, is something which is solely classified as production. It is still to provide motors for development work. We have to have these numbers of motors to do the development for increased flight tests and increased static tests and we will continue to classify this as development work for the next 2 or 3 years.

So I would like to say that from a strict connotation of production, this can't be classified as production facilities, but it is development facilities.

Mr. HARDY. Well, Admiral, I want to commend——

Admiral RABORN. I am sorry, I didn't make myself too clear.

Mr. HARDY. Frankly, I am not sure. Maybe you made yourself clearer than some of us folks might wish. But I want to commend the Navy and you for the progress that has been made in this area.

However, I don't want to see us get ourselves in a position where we are generating a situation for the future that is going to result in substantial losses. And I am wondering—and I want to put this one to Mr. Bantz—whether in this whole problem, or in this whole approach, to the increase of production facilities, we may be blindly pursuing a policy aimed to get out of all Government-owned facilities and put them under a situation where they will have to be privately conducted.

Now, I am in agreement with private performance of these contracts where it can be done economically and over the long haul. But if we are deliberately engaging in a program which is designed to render useless the Government-owned facilities, then, by George, we better stop and take another look.

Mr. GAVIN. Mr. Chairman——

Secretary BANTZ. May I answer the question, sir?

Mr. HÉBERT. Yes.

Secretary BANTZ. The answer is definitely "No" sir, we are not engaging in such a project.

Mr. HARDY. You and I have had discussions on this before, Mr. Bantz. I think we understand each other on it. But every now and then I run across another evidence that somebody has come up with an idea that this will give us a foot in the door and will enable us to abandon some Government-owned facility and procure the item on contract regardless of what the eventual cost is. I certainly hope that we are not getting into that in this area.

Mr. HÉBERT. Mr. Secretary, in answer to Mr. Hardy's question, you then can categorically—I mean just specifically assure this committee that that is not the contemplated policy, nor is the policy of the Navy?

Secretary BANTZ. That is right, sir.

I would like to amplify that, by saying that in my opinion the only facilities that are Government owned and Government operated that we will eliminate from our program in the years ahead are those that become uneconomical to operate because of the type or the class of the material they were constructed to produce being no longer needed.

Mr. HÉBERT. But if you have firm ground, you can take off those facilities and put on Government facilities up to date. That is the point.

It is all right to say that you will not use them, and then you put the qualifying phrase in there, "They can't produce." Well, naturally, if you have a blacksmith's shop you don't produce automobile tires, but if you take the blacksmith's shop off the ground and put the automobile tire production place there——

Secretary BANTZ. Yes, sir.

Mr. HÉBERT. That is what we are talking about.

Secretary BANTZ. Some of it will be done, I am sure.

Mr. HÉBERT Never mind—some of it. You were doing very well and then you qualified.

Secretary BANTZ. I didn't mean to, I am sorry.

Mr. HÉBERT. You don't mean to qualify. That is it. All right.

In other words, we are to understand, then, that the policy of the Navy—you can only speak for the Navy—is to utilize existing Government real-estate facilities for future construction, and not go out and build buildings, as Mr. Hardy pointed out, on land owned by private individuals.

Secretary BANTZ. Well, that is a policy. But I must qualify that, because obviously we are going to have to build some facilities——

Mr. HÉBERT. Oh, we recognize that.

Secretary BANTZ. In connection with private corporations in the future.

Mr. HÉBERT. Here Admiral Raborn has so adequately testified that production is a thing that can be placed in any part of the country after the know-how is there. So here you have a great facility at Indian Head. As I understand what the admiral has said, if I understood him correctly, the future of Indian Head is certainly not dark. On the contrary, it is rather bright, when this second stage is developed. Is that correct, Admiral?

Admiral RABORN. To the limit and purpose for which the powder factory has been constructed, which is to take a propellent from a research laboratory——

Mr. HÉBERT. And manufacture it.

Admiral RABORN. And to bring out the proper and most economical means to manufacture it into finished articles, so that this might be used as a yardstick.

In other words, this is a pilot line and not a mass-production capability.

Mr. HÉBERT. Of course, it would logically follow, if we were on the ground—if you subtract that from the cost, you are in business.

Mr. Gavin——

Mr. GAVIN. I would like to know if the Secretary can answer it. What is our total investment there in Sacramento now? What is the total?

Secretary BANTZ. Admiral Stroop has the figures available.

Admiral STROOP. We have a total in Aerojet at Sacramento and Azuza of $30 million.

Mr. GAVIN. $30 million?

Admiral STROOP. Yes, sir.

Mr. GAVIN. That is a lot of money.

Let me ask you this:

On what basis do we operate those plants? Do we lease them to the Aerojet or is it rent free, or on what basis are you operating?

Admiral STROOP. Aerojet operates these under a Bureau of Ordnance contract.

Mr. GAVIN. Yes.

Admiral STROOP. Management contract.

Mr. GAVIN. Yes.

What do you mean, a management?

What I am trying to find out: Uncle Sam makes an investment. They are in business to make a profit. Now, we put the money to build a plant, and usually equip these plants, along with the construction of the plants, to make it possible for them to operate.

Now, do you lease that to them at a certain—we have $30 million in there of the American taxpayers' money.

Admiral STROOP. That is——

Mr. GAVIN. Do you give it to them and tell them to operate it or do you lease it to them, or is it rent free, or just what do they return for what you supplied them in the way of plant and equipment?

Admiral STROOP. You pay them for operating it.

Mr. GAVIN. What?

Admiral STROOP. You pay them for operating it.

Mr. GAVIN. On what basis?

Admiral STROOP. On the basis that they pay the people who work in the plants. They go out and subcontract for the materials that they have to use in the manufacture and——

Mr. GAVIN. Mr. General Counsel, I think you ought to get into that phase and just see what results we get for the investments we make, in view of the fact that we have many plants that are not obsolete that could be made available without making these investments, that could be used by these various organizations in Ordnance.

Now, it would be interesting to find out what kind of an arrangement we have here.

Mr. HÉBERT. In this specific case, Mr. Gavin, we will have Mr. Kimball before us, and you can ask him——

Mr. GAVIN. Yes.

Mr. HÉBERT. Exactly what his arrangments are.

Mr. GAVIN. In the interim, I think the Counsel ought to apprise us. We have an investment now. Do we go in business and produce plants and finish the plants and turn them over to corporations to operate, no doubt on a profitable basis, or what return do we get for the investment we make? That is what I am interested in. I think we should be recompensed.

Secretary BANTZ. Mr. Gavin, I would like to say this as far as Sacramento is concerned and Aerojet——

Mr. GAVIN. We don't take Sacramento as Sacramento. This is in various phases of all three branches of the service. We have been building plants and equipping them.

Secretary BANTZ. I think the investment out there was made on the basis I tried to bring out in my opening statement, on the basis that the men who were responsible for making the decision decided in their judgment we would be further along out there with the Aerojet Corp. than any other place in the United States, and, as a result, the investment we made was warranted for the safety of this country, to produce the Polaris missile, which, as I said in my opening statement, in the opinion of those who know about it is probably one of the greatest deterrents this country has of stopping the Soviets in engaging in a major war.

Mr. GAVIN. I agree with you. But nevertheless somebody has to furnish the money to do these things, and these corporations—they are in business for what? What do you think they are in business for? Do they take the same attitude toward the operation, as you are taking? They are in business to make a profit, aren't they?

Secretary BANTZ. Certainly.

Mr. GAVIN. And I am interested to find out just what we are furnishing them and on what basis we are furnishing this equipment.

I fully realize that we have to move expeditiously. And the admiral has turned in a magnificent performance, of which he can well be proud, and we are proud of him in the work he has done. But nevertheless we are making big investments here and we just feel as though we would like to know on what basis you work. You don't seem to be able to tell us here this morning.

Secretary BANTZ. Well, I don't know as every one of our leases is the same. I would think in this instance there is a percentage of maximum profit, and offhand I cannot tell you what that percentage of maximum profit is in this instance.

Mr. HÉBERT. Mr. Kimball will be able to answer that question.

Mr. COURTNEY. Yes, sir.

Mr. HÉBERT. Mr. Lankford.

Mr. LANKFORD. Mr. Chairman, I simply wanted to say this, apropos of your conversation with Mr. Bantz, that the reason that Indian Head allegedly doesn't have the know-how in composite propellents is that they had no facilities to work with and they couldn't develop any know-how. And that is one way of not utilizing Government facilities.

Secretary BANTZ. Mr. Lankford, that has been, I thought, very ably discussed and explained by the two admirals here this morning.

The reason again, that the decision was made to go to Aerojet was in the judgment——

Mr. LANKFORD. I am not talking about Aerojet, Secretary Bantz, or the Polaris program. The Polaris program is too well established to do anything about now. But the point I am making is that you said that these facilities would be used to the extent that it was practical to use them, and so forth.

Secretary BANTZ. That is right.

Mr. LANKFORD. Well now, if Indian Head had been limited to facilities for making black powder, which they started out making, then—there is no more need for black powder, so there would be no more need for Indian Head. We have to progress with the times. The reason it is alleged that Indian Head doesn't have the know-how is because they didn't have the facilities to learn.

Secretary BANTZ. Well, again, Mr. Lankford, as both Admiral Stroop and Admiral Raborn said, if we foresaw a tremendous program for the future on this propellent for the Polaris missile, then there would be reason for developing at Indian Head some costly additional equipment. But as was brought out here, the research and development part of it is the big introductory. Then until we have a great many more submarines for utilizing this missile under contract—where money is first approved by the Congress—there is no reason for us making another investment.

Mr. LANKFORD. Well, had they had the facilities there, it is perfectly possible that Indian Head could have done some work on Minuteman there, on the Air Force missile, but they hadn't had any facilities, and they won't be able to make any composite propellent until sometime in November. There was no keeping up with the times. I don't want to belabor the point.

Mr. HARDY. Mr. Chairman, I just wanted to comment just a little bit on what Mr. Gavin said.

Mr. HÉBERT. Mr. Hardy.

Mr. HARDY. Because I think that is a particularly pertinent part of this thing we are concerned with.

While we have before us immediately the matter of Indian Head, the whole problem goes a lot further than Indian Head. We have to lift our sights above Indian Head. We are concerned here with the proper utilization of trained manpower that exists in these various installations that are Government-owned. We have to be concerned also with the best return for the dollars that are spent out of the tax funds. And I am right much exercised when I see tremendous expenditures for facilities being placed on privately owned property where eventually we can be pretty sure that the benefits are going to accrue to the private owners in the form of some sort of windfall, rather than to the taxpayers of the United States.

Mr. GAVIN. Would the gentleman yield?

Mr. HARDY. That is the thing I think we have to be primarily concerned with.

Mr. GAVIN. Will the gentleman yield?

Mr. HARDY. Yes.

Mr. GAVIN. The theory you expressed could be applied to any particular branch of our hardware—our planes, our tanks, our jeeps, our guns. Every form of weapon is just as important as the ones we are considering. Our submarines and everything—that idea. We have gone in for the past several years and we have built these plants, and not alone built the plants but we furnished the equipment, and not alone furnish the equipment but we give them progress payments so the weapon may be produced. So we would just like to know—in the aircraft industry we found some plants were rent-free, isn't that right, and some were leased and some were partly paid, and various forms.

I just thought it would be interesting to know what kind of—in view of the fact that we put so many millions of dollars in this facility here, I am interested to know what arrangements you have with the Aerojet.

Mr. HÉBERT. That will be developed.

Secretary BANTZ. Mr. Gavin, I would like to make this statement, to kind of clarify the situation.

Mr. Hardy, if you don't mind, I would like to state I think the impression has been created here that we are spending a terrific lot of money for facilities on privately owned land, other than Polaris.

Now, in my office—and these are the rules and regulations—any expenditure warranted by any division of the Navy for a facility that is to be erected on private property above half a million dollars must be O. K.'d by the Office of Naval Materiel. Anything above $1 million must be authorized by and approved by my office, myself. And I don't know—I am trying to think now—and I would be glad to supply it for the record. I can't think of over 2 or 3 that I have authorized in the fiscal year 1958.

Mr. HARDY. I hope you haven't. But there have been a block of them authorized in the past.

Secretary BANTZ. That is right, sir.

Mr. HARDY. And we found out we have been increasing them as time goes on.

Secretary BANTZ. During emergency periods in wartime, that is right, sir.

Mr. HÉBERT. That emergency still exists apparently, because there are still great building programs coming along. I wonder sometimes whether the Navy is on land or sea.

Mr. GAVIN. This authorization bill that we vote on today—what is that? $1.7 billion?

Mr. HÉBERT. The construction bills take 3 weeks for the committee to clear every year. There must be a lot of construction going on.

Secretary BANTZ. Well, I think the total, as you said, was $1.7 billion for all the services.

Mr. GAVIN. That is right, for all three services, yes.

Secretary BANTZ. The Navy was substantially less than a third of that.

Mr. HARDY. The Navy showed it was getting along pretty well.

Mr. HÉBERT. Gentlemen, thank you very much for your testimony.

The committee will recess until 10 o'clock tomorrow morning.

(Whereupon, at 12 noon, the subcommittee adjourned, to reconvene at 10 a. m., Friday, July 11, 1958.)

UTILIZATION OF NAVAL POWDER FACTORY, INDIAN HEAD, MD.

FRIDAY, JULY 11, 1958

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SPECIAL SUBCOMMITTEE FOR INVESTIGATIONS,
Washington, D. C.

The subcommittee met, pursuant to adjournment, at 10 a. m., Hon. F. Edward Hébert (chairman of the subcommittee) presiding.

Mr. HÉBERT. The committee will be in order.

The Chair wishes to announce that at the close of Mr. Kimball's testimony the committee will go into executive session for the purpose of receiving classified information, at which time, of course, the public will be excused and only the witnesses and the individuals of the company, of the Aerojet, who are with Mr. Kimball, will be allowed to remain in the room at that time. We want to see that film.

Mr. MILLER. Mr. Chairman——

Mr. HÉBERT. Yes.

Mr. MILLER. I have a very important matter to take care of for the committee and I ask to be excused for the time being. I will be back.

Mr. HÉBERT. All right. The committee will be in order.

Mr. Courtney——

Mr. COURTNEY. Mr. Chairman, we have asked and have present here Mr. Dan A. Kimball, who is the president of Aerojet General Corp. of Sacramento, Calif., or the principal office, or one of which offices is in Sacramento and is engaged in the manufacture of the Polaris fuel that has been discussed here this morning.

Mr. Kimball has a prepared statement and will proceed in order.

Mr. RIVERS. Is this the same Mr. Kimball who was such a distinguished Secretary of the Navy?

Mr. KIMBALL. Thank you, Mr. Rivers.

Mr. HÉBERT. You want him to affirm it or not?

Mr. RIVERS. I want the record to show that.

Mr. HÉBERT. Are you a friend?

Mr. RIVERS. Of course, I am a friend. The record shows that.

Mr. HÉBERT. All right, Mr. Kimball.

STATEMENT OF MR. DAN A. KIMBALL, PRESIDENT OF AEROJET GENERAL CORP.

Mr. KIMBALL. Mr. Chairman and gentlemen, I have with me Mr. Zisch, who is the vice president and general manager, who I brought here with me to help answer any questions which I might fumble.

It was quite a surprise to me to learn through the medium of local newspapers, first on June 30 and then in subsequent issues early this month, that the problem of unemployment in connection with the Indian Head powder factory here in Maryland had somehow become a controversial issue involving Aerojet-General Corp., of which I am president and with which I have been associated for nearly 15 years.

I personally don't see that there is any logical basis for the controversy. It should have never arisen because we are in an entirely different line of business. We cooperate with, but we are in no sense a competitor of Indian Head's. Our purpose and processes are entirely different from theirs and our positions in the missile field, while related, are not parallel. They do not partake of the nature of rivalry.

We must also bear in mind that the facilities of Aerojet and those of Indian Head properly may be said to belong to the Nation as a whole. When a choice is made between facilities, that choice should depend entirely upon efficiency and effectiveness in doing the Nation's defense job.

The highly competitive nature of private industry makes it essential that a company put forward its best efforts in order to survive. The fact that Aerojet not only has survived, but has reached the top in rocket-engine development and production is prima facie evidence of the kind of management it has had for 15 years, the kind of scientific forethought it has exercized and the kind of technical and material strength it brings to the whole missile program.

With these broad thoughts in mind, I would like to outline briefly how Aerojet originated, how it grew, what it does and why it has become what it is—the largest organization in the United States today devoted exclusively to the development of solid and liquid rockets, rocket propellents, high altitude sounding vehicles and missile and satellite vehicle components.

We do business with all the armed services and currently more business with the Air Force than with the Navy or the Army. We also do a considerable amount of business with the Atomic Energy Commission and some with the Post Office Department.

All this business has been earned because we had first of all the technical competence; secondly, we have always been forward looking; and thirdly, we built up the finest facilities possible in large measure with our own funds. It is our past forethought which makes it possible for us today to handle programs which other people are not able to undertake immediately or efficiently.

Aerojet was originated in 1942 by a group of California scientists who formed the Aerojet Engineering Corp. to manufacture and develop liquid and solid rocket engines and to go into production of the JATO unit.

In 1944, due to manufacturing and financial difficulties, the General Tire & Rubber Co., which I represent, purchased controlling interest in the company. At the end of the war, the Navy and the Air Force asked us to continue in business because, at that time, we had the greatest technical competence in the country in the manufacture of rocket engines.

We purchased our facilities in Azusa, Calif., which then were owned by the Government. The General Tire & Rubber Co., decided to keep Aerojet in business because they felt they had a definite obli-

gation to do so for the security of our country and not for the expectation of profit, although we did not want to lose any money.

In the 12 years since then, the company has grown and all the profits that have been made have been put back into facilities. Aerojet has put over $30 million in facilities and expects to continue to do so. We pay no dividends to our stockholders.

We have approximately 2,695 engineers, scientists, physicists and chemists. In my opinion, this is the largest group of technical people anywhere in the world devoted mainly to rocket propulsion.

Aerojet currently has 168 prime contracts and 70 principal subcontracts. These procurements represent 332 different projects. At the present time our business is 85 percent research and development, about 15 percent in production. Everything we manufacture we have developed. All composite propellent in this country was originated and developed by our company. The improvements have come from the efforts of the Aerojet technical people, working in cooperation with the chemists of the General Tire & Rubber Co.

In order to have technical competence and to know we have it, years ago we established and have maintained a Technical Advisory Board, headed by Dr. Theodore von Karman, and including Dr. Clark B. Millikan, Dr. Bruce Sage, Dr. Homer J. Stewart, Rear Adm. Calvin M. Bolster (retired), and Maj. Gen. A. W. Vanaman, USAF (retired).

The basic issue, it seems to me, concerns unemployment at Indian Head and other Government-owned facilities and it cannot be effectively remedied unless the kind of know-how which we have built up is applied. It cannot be done overnight with the facilities now existing.

The physical layout does not now lend itself to the kind of work we have to do in connection with Polaris or other large solid propellent rockets. The know-how in this specialized field does not now exist there.

With respect to the contracts which our company has in connection with Polaris there has been no duplication of facilities. A great proportion of our facilities was built up at our own expense and it is because we were ready and able to get the Polaris program underway immediately that we were given the go-ahead. The best proof of our readiness is that we have been running well ahead of schedule on this program, so far as propulsion is concerned. It is this performance which also has attracted the Air Force to our capabilities.

When the time comes to put Polaris or any other rocket into production, we will be more than happy to cooperate with the Defense Department and put that production any place where it will be to the best interest of the country.

We have a record of increasing employment wherever we have gone—Azusa, Sacramento, San Ramon, and Frederick, Md. I don't think the solution lies in trying to reduce our Sacramento operations. This would not make commonsense and would not be in the national interest. In the last 20 years I have probably spent as much time in the Washington-Maryland area as in California. I am as completely in sympathy with future employment here as I am out there. I think the way to get it is to apply initiative and know-how.

I appreciate your courtesy and I will be very happy to answer any questions.

Mr. HÉBERT. Thank you, Mr. Kimball, very much.

I want to do first things first. I want to get the record cleared up in one particular instance.

At the very opening of your statement you indicated that you relied on newspaper stories for the information concerning the controversy which has arisen with Indian Head as related to Aerojet in California. I believe you said that in your statement.

Mr. KIMBALL. Yes, sir.

Mr. HÉBERT. So I, too, am relying on a newspaper story to clear up the record.

On Friday, July 4, in the Washington Post, there appeared an article by a very reputable and accurate reporter, Mr. Lawrence Stern, under the heading "Kimball Hits Facilities at Indian Head."

Now, in fairness to you, I will say we discussed this privately, but I wanted it spread on the public record in order that we will have the record correct.

In there you are quoted as saying that this investigation was just a political dodge, and, quoting you directly, your words, "They have got to have something to talk about. I will be darn glad to give them my views."

Is that an accurate quote, Mr. Kimball?

Mr. KIMBALL. That is not an accurate quote, Mr. Chairman. It wasn't an interview. I had a telephone call in New York from Mr. Stern and he asked me about this and I said, "Well, if they wanted to investigate it, I thought it should be brought out in the open." I think certainly Congress should know the facts in these cases. But I don't think this is a political dodge. This is a legitimate inquiry, in my opinion.

Mr. HÉBERT. You did—then you do not consider this investigation a political dodge?

Mr. KIMBALL. No. I am sure it is not.

Mr. HÉBERT. Thank you very much. I just wanted the record to be clear on that point.

Now, just one question. In connection with the plant—how do you pronounce that town in California?

Mr. KIMBALL. Azusa.

Mr. HÉBERT. Azusa. Did I understand you to say that the plant was originally owned by the Government and then purchased by Aerojet?

Mr. KIMBALL. When Aerojet started, they had their engineering offices in Pasadena and they wanted a production capability. So they put this plant up, to our design, out in Azusa, about 15 miles out of Pasadena.

Mr. HÉBERT. By "they" you mean the Government?

Mr. KIMBALL. The Government, Defense Plant Corporation.

Mr. HÉBERT. Yes.

Mr. KIMBALL. At the end of the war, when the Navy and the Air Force asked us to stay in the rocket business, we decided if we were going to stay in it we should be in our own facilities, so we purchased that plant from the Government, and we own it.

Mr. HÉBERT. That is the plant now in question, or——

Mr. KIMBALL. No, that is the plant in Azusa.

Mr. HÉBERT. How much did you purchase that plant for, do you recall?

Mr. KIMBALL. Oh, I think seven or eight hundred thousand dollars.

Mr. HÉBERT. How much on the dollar was that, the original investment in that plant?

Mr. KIMBALL. I couldn't remember, sir. I would think it was about 35—30, 35 cents on the dollar.

Mr. HÉBERT. 35 cents on the dollar Aerojet purchased this Government plant for?

Mr. KIMBALL. Yes.

Mr. HÉBERT. And what is it being used for at the present time?

Mr. KIMBALL. Still being used for Government work.

Mr. HÉBERT. In which area, in which field?

Mr. KIMBALL. In the chemical field, in the rocket metal parts manufacture, in the architectural engineering, the underwater propulsion, the explosive ordnance, and structural plastics.

Mr. HÉBERT. And has Government contracts?

Mr. KIMBALL. All Government contracts.

Mr. HÉBERT. Now, the plant at Sacramento, it was testified yesterday, is on land owned by Aerojet; is that correct?

Mr. KIMBALL. That is correct.

Mr. HÉBERT. Facilities that are being built are being built with Government money?

Mr. KIMBALL. Part of them. The facilities that are being built are on Navy-owned lands. They are being built with Government money. But we are also putting, in fact, a considerable amount of our own money in there.

Mr. HÉBERT. They didn't say "Navy-owned land." They said "Aerojet-owned land" yesterday, according to their testimony.

Mr. KIMBALL. It is on Aerojet-owned land, but it is the option of the Government to take that any time they want and to terminate the contract any time they want.

Mr. HÉBERT. What is the consideration of the Government in case it desires to take over the land? On what basis would that be?

Mr. KIMBALL. We got the exact words here, but the basis of it is that the Navy can stop doing business with us any time they want and they have an option to take over the land at not over $100 an acre.

Mr. HÉBERT. Not over $100 an acre.

Mr. KIMBALL. At not over $100 an acre.

Mr. HÉBERT. By that you mean not over $100—the agreement with Aerojet is that it will not cost the Government over $100 an acre?

Mr. KIMBALL. That is right, and if Aerojet and the contracting officer can't decide what the fair price will be, then it is left to the discretion of the Secretary of the Navy to set that price.

Mr. HÉBERT. But it could not be over $100 an acre?

Mr. KIMBALL. That is right.

Mr. HÉBERT. What price did you pay for that per acre, do you know?

Mr. KIMBALL. We bought that land—we bought it in a number of parcels. We got about 18,000 acres.

Mr. HÉBERT. The average price.

Mr. KIMBALL. We bought it from $20 an acre up to $200 an acre—$250 an acre. I would think an average price of maybe $60, $70.

Mr. HÉBERT. $60 or $70 would be your average?

Mr. KIMBALL. Yes.

Mr. HÉBERT. How many thousand acres in that?

Mr. KIMBALL. We have 18,000 acres.

Mr. HÉBERT. At an average of about $67, in round figures.

Mr. KIMBALL. Something of that figure, when we bought it. We tried to buy more land, now, where they want $1,000 or $2,000. The price of land has gone up around there.

(Mr. Cunningham, aside.)

Mr. KIMBALL. The land was pretty worthless land, because it has been dredged over for 50 years for gold.

Mr. HÉBERT. Isn't it river bottom, too?

Mr. KIMBALL. Gold river bottom, but it is old gold dredging.

Mr. HÉBERT. You want to say something?

Mr. KIMBALL. The land for our purpose was ideal. For any other purpose it wouldn't be worth very much.

Mr. HÉBERT. Now, as I understand, your position now, Mr. Kimball, is that practically everything is research and development, with a very small percentage of production.

Mr. KIMBALL. That is right.

Mr. HÉBERT. And that when——

Mr. KIMBALL. About 85 percent of our business is research and development and about 15 percent is production.

Mr. HÉBERT. And then when you refer to lack of know-how and inadequate facilities at Indian Head, you refer only to the area of research and development and not to the area of production.

Mr. KIMBALL. Well, in solid propellents, first—you see, Polaris isn't the only solid rocket we are developing. We have something like 25 different solid rocket engines that we are developing, some of them being in production, like our JATO unit and the other units that we are in small production on are not on the Navy-owned facilities. They are on our own facilities there. We have five propellent manufacturing lines there. Three of them are owned by the Government and two of them are owned by us there.

Mr. HÉBERT. But when the time of production arrives, it will be possible to put production in any area of the country——

Mr. KIMBALL. Any place they want to put it. That is up to the Defense Department.

Mr. HÉBERT. That is up to the Government?

Mr. KIMBALL. Sure.

Mr. HÉBERT. And would be the more economical labor market.

Mr. KIMBALL. Where it is the most economical place to put it. We have said when they want it and this thing is ready for production, then we will put it wherever they want. We will help them. We hope to develop it.

Mr. HÉBERT. What we are really discussing is research and development on the Polaris propellent and not production.

Mr. KIMBALL. Yes. It is quite significant. The work that we do with the individual services—the services help each other. The work we do with the Air Force, for example, had a great bearing on the fact we could get this Polaris started much faster than anybody thought it was possible.

Mr. HÉBERT. You refer to the Air Force. What type of contract do you have with the Air Force?

Mr. KIMBALL. Various kinds of contracts. Some on cost-plus-a-fixed-fee for research and development. And some of them, a few of them, on a fixed-price contract where we are in limited production on a few items.

Mr. HÉBERT. Do you do any private business at all?

Mr. KIMBALL. On a little bit with JATO units for commercial airplanes. That is the only private business we do. Everything else is with the Government.

Mr. HÉBERT. You have, then, the Government as your sole customer?

Mr. KIMBALL. That is right.

Mr. HÉBERT. In effect.

Mr. KIMBALL. Yes.

Mr. HÉBERT. Except for the JATO, the limited amount of JATO?

Mr. KIMBALL. Well, except in our nuclear field. We make some nuclear reactors in San Ramon and other places.

Mr. HÉBERT. That is not involving Government funds?

Mr. KIMBALL. No. We have some Government contracts there, but we developed these reactors with our own funds and sold them privately.

Mr. HÉBERT. Now, with the sole customer being the Government, what, then, is your rate of return on your investment with the Government?

Mr. KIMBALL. Our profit last year was 2.3 percent.

Mr. HÉBERT. That is after taxes, of course.

Mr. KIMBALL. After taxes.

Mr. COURTNEY. On sales.

Mr. HÉBERT. What was it before taxes?

Mr. COURTNEY. On sales.

Mr. KIMBALL. Our sales last year was $161 million. Our profit before taxes was $7,773,230. Our profit after taxes was $3,818,230.

Mr. HÉBERT. What would that percentage be, to get a fast figure on it? A $7 million profit compared to $61—these are all sales you are speaking of now.

Hr. KIMBALL. $161 million sales.

Mr. HÉBERT. $161 million in sales.

Mr. KIMBALL. Yes.

Mr. HÉBERT. What rate of profit would that be, before taxes?

Mr. KIMBALL. It would be a little less than——

Mr. RIVERS. Less than 5 percent.

Mr. KIMBALL. Four and a half percent.

Mr. RIVERS. Yes; less than 5 percent.

Mr. KIMBALL. 4.5 percent.

Mr. HÉBERT. Now——

Mr. KIMBALL. Before taxes and about 2.2 or 2.3 after taxes.

Mr. HÉBERT. Now, how large a key organization do you have on the level of administration; I mean from yourself down?

Mr. KIMBALL. You speak of technical people.

Mr. HÉBERT. No; I am speaking of administration. You are the president of Aerojet.

Mr. KIMBALL. Well, our administrative organization is quite small.

Mr. HÉBERT. But you are the president.

Mr. KIMBALL. Yes; that is right.
Mr. HÉBERT. How large is your board of directors?
Mr. KIMBALL. Eleven.
Mr. HÉBERT. Eleven on the board of directors.
Mr. KIMBALL. Yes.
Mr. HÉBERT. What is your salary?
Mr. KIMBALL. My salary?
Mr. HÉBERT. Yes, sir.
Mr. KIMBALL. I was paid by the General Tire & Rubber Co. It is $30,000 a year.
Mr. HÉBERT. Oh, you are not paid by Aerojet?
Mr. KIMBALL. No, not salary—only additional compensation by Aerojet, $35,000.
Mr. HÉBERT. You are just on loan?
Mr. KIMBALL. I am a director of General Tire and Rubber Co. They pay my salary and pay my expenses.
Mr. HÉBERT. And they do not charge it to the operation of Aerojet?
Mr. KIMBALL. Yes; they do charge it, but they—we have a management fee, because we have our Akron research people, our legal people and administrative people that are all coming out there all the time. So, we pay them a fee that is based on what percentage of Akron's overhead is applicable directly against Aerojet.
Mr. HÉBERT. Now, the committee is not to understand that your specific salary of $30,000 a year is not chargeable against the contract of Aerojet.
Mr. KIMBALL. Well, indirectly, it gets paid there; yes.
Mr. HÉBERT. Of course, it is charged to it.
Mr. KIMBALL. Yes.
Mr. HÉBERT. Now, the board of directors. What are their fees, director fees?
Mr. KIMBALL. No director's fees.
Mr. HÉBERT. No director's fees?
Mr. KIMBALL. No.
Mr. HÉBERT. They get no fees when they attend directors' meetings?
Mr. KIMBALL. No.
Mr. HÉBERT. You pay no bonuses?
Mr. KIMBALL. No. We pay at the end of the year added compensation. It is an adjusted compensation.
Mr. HÉBERT. What——
Mr. KIMBALL. It is not a bonus. We don't pay any bonuses based on profits or anything else.
Mr. HÉBERT. What is it, this added compensation, based on?
Mr. KIMBALL. It is based on length of service and, in the case of about 25 or 30 people, the value that we think they have been to the company each year. In place of giving them a salary increase, if someone has done a particularly good job they will get additional added compensation.
Mr. HÉBERT. It is additional money. You call a rose by any other name, it is still a rose.
Mr. KIMBALL. It is still part of their salary.
Mr. HÉBERT. That is right. It is still a part of the salary, whether it is a new name that I heard for the first time, "added compensation." It is additional money. It is part of the bonus.
Mr. KIMBALL. It is a bonus, but not in the sense that it is based upon earnings.

Mr. HÉBERT. It is still folding money.
Mr. KIMBALL. That is right; they spend it.
Mr. HÉBERT. And that is what counts.
Mr. KIMBALL. That is right.
Hr. HÉBERT. Mr. Rivers.
Mr. RIVERS. I pass, for the time being.
Mr. HÉBERT. Mr. Cunningham.
Mr. CUNNINGHAM. Mr. Chairman, I would like to ask Mr. Kimball a few questions.

By the way, Congressman Bates is on other work for the committee elsewhere, and he can't be here, and he asked me to give you his regards.

Mr. KIMBALL. Thank you.
Mr. CUNNINGHAM. You said that you purchased this for about 35 cents on the dollar. Was that surplus at the time?
Mr. KIMBALL. It was declared surplus and put up for bid.
Mr. CUNNINGHAM. And you bought it at public auction?
Mr. KIMBALL. Yes.
Mr. CUNNINGHAM. On competitive bid?
Mr. KIMBALL. Competitive bidding.
Mr. CUNNINGHAM. Sealed bid?
Mr. KIMBALL. Sealed bid.
Mr. CUNNINGHAM. You were the lowest bidder?
Mr. KIMBALL. We were the highest bidder.
Mr. CUNNINGHAM. The highest bidder.
Mr. KIMBALL. As a matter of fact, nobody else bid on it. They didn't bid 25 percent of what we bid.
Mr. CUNNINGHAM. I was interested in your figure of 35 percent. That is exceptionally high for surplus property that has been sold by the Government. I find that it generally sells for about 10 percent.
Mr. KIMBALL. Well, maybe we bid too much for it.
Mr. CUNNINGHAM. What is the date of your purchase?
Mr. KIMBALL. I have forgotten exactly; 1946 or 1947. When they decided to stay in the business, then they put it up for purchase, and we put in a bid, and it took several months—sometime in late 1946 or early 1947.
Mr. CUNNINGHAM. Mr. Kimball, if I understood you correctly, the total purchase price was less than $1 million.
Mr. KIMBALL. That is right.
Mr. CUNNINGHAM. Did that include the land?
Mr. KIMBALL. Yes.
Mr. CUNNINGHAM. I notice it is an average of $60 an acre; 18,000 acres would make it over $1 million.
Mr. KIMBALL. No. The land in Azusa was only 105 acres at the time.
Mr. CUNNINGHAM. Well, that is what you bought from the Government.
Mr. KIMBALL. Yes.
Mr. CUNNINGHAM. And that had improvements on it in the way of buildings?
Mr. KIMBALL. It had a lot of specialized test equipment and buildings of that kind.
Mr. CUNNINGHAM. Just a couple of more questions, Mr. Kimball. You said you paid no dividends?

Mr. KIMBALL. No.

Mr. CUNNINGHAM. Is that the policy of the company, to pay no dividends?

Mr. KIMBALL. The policy—we like to pay dividends, but we can't afford them. All the money we make we have to put back in facilities. This three million eight we made last year, we put over $6 million back into additional facilities. We are putting a similar amount this year.

Mr. CUNNINGHAM. Is General Tire the main stockholder?

Mr. KIMBALL. Eighty-eight percent.

Mr. CUNNINGHAM. Eighty-eight percent.

Who owns the balance? Employees?

Mr. KIMBALL. No.

Mr. CUNNINGHAM. Is it an actively traded stock or listed stock?

Mr. KIMBALL. Well, it is over the counter.

Mr. CUNNINGHAM. Not many purchasers for it, if you don't pay dividends, are there?

Mr. KIMBALL. Well, they seem to buy it. They bid the price up pretty high for it. Too high, I think.

Mr. HÉBERT. May I——

Mr. CUNNINGHAM. Yes.

Mr. HÉBERT. There, Aerojet pays no dividends, but General Tire pays dividends.

Mr. KIMBALL. Sure.

Mr. CUNNINGHAM. That is what I was coming to.

Mr. KIMBALL. Sure.

Mr. CUNNINGHAM. And General Tire gets some of the profit of it.

Mr. KIMBALL. Well, 88 percent of any profit they make would accrue to them.

Mr. CUNNINGHAM. But 88 percent of the stock of this company is owned by Aerojet. But is any money paid to Aerojet?

Mr. KIMBALL. You mean to General Tire?

Mr. CUNNINGHAM. I mean to General Tire.

Mr. KIMBALL. Only to point of what there out-of-pocket expenses are, as determined by the Government auditors and our auditors.

Mr. CUNNINGHAM. Then any profit that General Tire gets out of this would be an increase in the price of shares of the stock it owns in the company, which is 88 percent.

Mr. KIMBALL. Yes.

Mr. CUNNINGHAM. Has that price increase been going up?

Mr. KIMBALL. Yes, sir.

Mr. CUNNINGHAM. There must be a basic reason for that.

Mr. KIMBALL. Well, our business has been going up.

Mr. CUNNINGHAM. How is that?

Mr. KIMBALL. Our business has been going up.

Mr. CUNNINGHAM. Yet you are only making a net profit of 2.2 percent.

Mr. KIMBALL. Well, you can't make any more on Government business. The profit in Government business is low. It has to be.

Mr. CUNNINGHAM. That is all, Mr. Chairman.

Mr. KIMBALL. We can't make as much in that business as we can in commercial business. We don't expect to.

Mr. HÉBERT. In commercial work there is competition. In Government work you have one buyer.

Mr. KIMBALL. We are in pretty tough competition, Mr. Chairman. There are a lot of people going after the business, the same as we are.

Mr. HÉBERT. Despite the fact there is no profit.

Mr. KIMBALL. There is profit. Our company has been built up over 15 years. We think we have done an outstanding job.

Mr. HÉBERT. You may have done an outstanding job, but the point I want to show, Mr. Kimball, is that this is not all for love of mother, God, and country. You hope to make some money?

Mr. KIMBALL. That is right.

Mr. HÉBERT. So any statement that you are pouring it back for patriotic reason obscures the fact.

Mr. KIMBALL. Obviously, if we are going to do a good job and continue to get business from the Government we will be in a favorable position, if we have the best facilities and the best people.

Mr. HÉBERT. There is no sin in making a profit.

Mr. KIMBALL. I am for it.

Mr. HÉBERT. I am strictly for it myself.

Incidentally, being former Secretary of the Navy hasn't hampered your association in doing business with the Government, has it?

Mr. KIMBALL. Well, I don't think it has hampered it any. It hasn't helped me a hell of a lot.

I may point out we do more business with the Air Force than we do in the Navy.

Mr. HÉBERT. I want to go into the Air Force contract a little later on.

Mr. Hardy——

Mr. HARDY. Yes.

Mr. Kimball, I am glad to see you, too, this morning. Our paths haven't crossed for some little while.

I would like to discuss for a moment this question of profit and capital investment in Aerojet. You discussed the rate of profit awhile ago as compared to sales.

Have you computed the profit in Aerojet as compared to capital invested?

Mr. KIMBALL. I have the figures here. I have a statement which I would be happy to give you.

Mr. HARDY. Well, if you just got a rough figure there, I would just like to get it.

Mr. KIMBALL. Our total assets are $51 million.

Mr. HARDY. Your total assets are $51 million. That is not quite the figure that I was looking for. I was thinking about capital invested, which is not necessarily represented by assets.

Mr. KIMBALL. No.

Our stockholders equity is $26,641,000.

Mr. HARDY. That is the figure I was thinking about.

Mr. KIMBALL. Yes.

Mr. HARDY. The stockholders equity is twenty-six million some and your profit before taxes was how much?

Mr. KIMBALL. $7,773,000.

Mr. HARDY. That is a little over 25 percent, then, on the basis of before taxes.

Mr. KIMBALL. We give the Government back half of that, though.

Mr. HARDY. I understand. I know all of us have to be confronted with that picture.

Now, you spoke about Aerojet not paying dividends. Had Aerojet never declared any dividends?

Mr. KIMBALL. Yes, we paid a dividend in 1953 and at that time we told the stockholders, the other stockholders, that it seemed to us that the demand for capital in this business was going to be such that we would not be able to pay any more dividends for the immediate future, and anyone that needed dividends—we offered to buy their stock at what we thought was a fair value. At that time we did pay a dividend. Most of the stockholders sold out to us at that time.

Mr. HARDY. That is a right good way to get a chance to buy the stock. [Laughter.]

Mr. KIMBALL. At that time we owned 93 percent of the stock. Last June we found we were short of working capital and we needed more money in the business, when we sold publicly another $7½ million worth of stock in a private placement.

Mr. HARDY. Well, I am trying to arrive at some understanding as to how much original capital, original private capital had gone into Aerojet, a firm that is not paying any dividends, and how much of the capital employed was actually built up through accumulated earnings on Government business.

Mr. KIMBALL. The $7,500,000 additional capital we put in last year through the sale of stock was additional, and most of the rest of it has been built up through earnings on Government business.

Mr. HARDY. So actually——

Mr. KIMBALL. I would say of this $26 million that was our stockholders equity, about $16 million of it was built over from Government earnings—well, more than that. We have—let me get these figures straight. I brought a lot of figures down here so I could answer questions accurately.

From 1944 to the present time our cumulative earnings have been $20 million—$20,075,000. We have put back into plant investment $30,201,000. We put back $10 million more than we have made.

Mr. HARDY. That includes the $7 million stock sale.

Mr. KIMBALL. That is right.

Mr. HARDY. So actually, then, other than earnings on Government contracts that have been accumulated, there is—where did the other $3 million come from? Was that the initial investment, private investment?

Mr. KIMBALL. We put some money in the thing to start with. Then——

Mr. HARDY. It is not surprising—I think in most of this kind of a situation the private contractor would not normally employ a lot of his own capital in this kind of a proposition. I think that is understandable. But I am trying to understand where we are as of now, as of Government contracts, and your indication is there has been a total of about $10 million of private capital put into Aerojet.

(Mr. Kimball nods.)

Mr. HARDY. Which would mean there had been about $3 million, or 2½ million, prior to the stock sale of a year ago.

Mr. KIMBALL. That is right.

Mr. HARDY. Now, during that same period, when you had the 2½ million going in prior to 1953, you did pay dividends. Do you have any figure on the total dividends that were paid during the period when you were distributing?

Mr. KIMBALL. Oh, I think it was about 4 percent of what we made up to that time. I can get you the exact figure——

Mr. HARDY. Well, it is all right. It is not too important. I was just trying to see whether there might be any relationship between the capital originally employed, private capital originally employed, and the amount of dividends declared over that period of time.

Mr. KIMBALL. Well, at that time it was about 4 percent of what our profits were, and we could see that we had to put so much money back into facilities to do the job we thought was necessary that we decided we couldn't pay a dividend.

Now, I will be very frank with you. We hope some day we are going to be able to pay some dividends. But I have also been very frank with our stockholders, that I don't see any chance within the next 4 years to pay it.

Mr. HARDY. Now, let's talk about these facilities a little. The Azusa plant that you purchased: I believe in your comments on that you indicated that the company thought it was going to stay in that kind of business and wanted to buy that plant. Now, was the plant idle at the time it was declared surplus?

Mr. KIMBALL. The war was over and we were about out of contracts and the Government owned it and said they were going to declare it surplus. They wanted to get rid of it. We were occupying it at that time.

Mr. HARDY. You were occupying it and the plant actually was in operation, then?

Mr. KIMBALL. That is right. Just barely.

Mr. HARDY. While it was in operation the decision was made to discontinue its operation, apparently, because if it had any use to the Government normally it would not have been declared surplus, any foreseeable use. I think you are familiar with that procedure.

Mr. KIMBALL. Yes, sir.

Mr. HARDY. But actually the plant never did shut down and you acquired it under the regular procedure of sale by General Services and you were successful in getting additional contracts immediately after its acquisition to keep it going, I take it.

Mr. KIMBALL. That is right. At that time we were down to 350 people.

Mr. HARDY. Down to 350 people?

Mr. KIMBALL. Yes.

Mr. HARDY. Well, now, with respect to your Sacramento facilities, did you build those originally or were they originally built by the Government?

Mr. KIMBALL. In 1950 rocket manufacturing and testing was a pretty noisy procedure. It was getting to the point where in Azusa we were pretty well isolated, but then the town built up to us. So the testing—the test firings we had to make, which ran about 60 or 70 firings a day, bothered the neighbors so much it was decided we had to leave. So we wanted to get a good sized tract of land fairly close to a city, but the noise wouldn't bother anybody. We went up to Sacramento and found this old gold dredging property that was for all intents and purposes perfectly useless. So we bought the land up there. Then we put in a solid propellent manufacturing plant. The Navy thought they needed more than that. We said, "Well, we thought

the lines we were putting in were sufficient to take care of any peacetime needs." They decided they needed more capacity. So they put in two other lines with their money. We built our own administration buildings, our own production lines, our own chemical laboratories, garages and so forth. But they wanted some additional capacity. So they put these two additional lines in there.

Mr. HARDY. And they built the facilities for those lines.

Mr. KIMBALL. They built the facilities.

Mr. HARDY. Then the Sacramento plant was not begun until 1950.

Mr. KIMBALL. 1950.

Mr. HARDY. And actually you acquired that land because you felt the need for additional facilities to those that you had in Azusa.

Mr. KIMBALL. Well, we had to get away—we couldn't make so much noise in Azusa. We had to get away.

Mr. HARDY. So the land, the acquisition of the Sacramento site, then, was in order to carry on the work that had been done at Azusa previously.

Mr. KIMBALL. Yes.

Mr. HARDY. But you did continue to operate the Azusa plant?

Mr. KIMBALL. For different uses.

Mr. HARDY. For different uses, I see.

Mr. KIMBALL. Yes.

Mr. HARDY. Now——

Mr. KIMBALL. We have 10 divisions, 2 of them in Sacramento—the solid propellent business and the liquid rocket manufacture; in Azusa we have the 8 other divisions.

Mr. HARDY. But all still on Government contracts, in both Sacramento and Azusa.

Mr. KIMBALL. That is right.

Mr. HARDY. Then you bought the land and you put up the first buildings in Sacramento.

Mr. KIMBALL. Yes.

Mr. HARDY. Now, how did the size of the Government-owned facilities at Sacramento initially compare with those which Aerojet built? I think we can simplify that a little. What is the total investment in plant and facilities?

Mr. KIMBALL. I think at the time we went up there, we put up a little more than what the total cost of the facilities were.

Mr. HARDY. What is the total Aerojet investment in plant and facilities, other than land, at Sacramento?

Mr. KIMBALL. I would have to get the figures. I think about twenty-some-odd million dollars.

Mr. ZISCH. About $20 million.

Mr. KIMBALL. $21 million we have invested in Sacramento facilities.

Mr. HARDY. I was trying to draw some comparison as between your total plant investment in Sacramento and the Government plant investment both present and proposed under the current expansion program.

Mr. KIMBALL. Out of $30 million of our own investment, we have $20 million in Sacramento.

Now, the Government had put in the solid propellent plant and are putting about $25 million.

Mr. HARDY. So that the Government's plant investment in Sacramento when they conclude this current expansion program will be considerably in excess of Aerojet's plant investment?

Mr. KIMBALL. Well, we are keeping up pretty good with them. We are putting $7 million in this year. We are going to have to put another 6 or 7 million dollars in next year, in our own facilities.

Mr. HARDY. Now, with respect to——

Mr. KIMBALL. Incidentally, in Government plants I don't think anybody has a higher percentage of their own money invested than we have in this.

Mr. HARDY. Well, that is one of the things that has bothered me a little bit when I have examined some of these others. That is why I am asking some of these questions, because I have seen some things in connection with other governmental plants, and particularly some of your scrambled plants, that disturbed us a little bit. That is why I am trying to understand what is the situation here.

Mr. KIMBALL. The Navy-owned lands. Those are separate lands and the Navy can discontinue their contracts with us at any time. And they are separate facilities.

Mr. HARDY. I understand that. I want to talk a little bit more about that in a minute. But with respect to the facilities that you built, that Aerojet built in Sacramento, did you build them under an accelerated amortization certificate?

Mr. KIMBALL. Most of them, some kind of acceleration.

Mr. HARDY. To what extent are they depreciated now?

Mr. KIMBALL. Oh, I will get those figures and put them in the record for you. I can't tell you offhand.

Mr. HARDY. That would have a considerable bearing on the significance of your profit picture.

Mr. KIMBALL. Sure.

Mr. HARDY. Well, now, normally those accelerated amortization certificates speed the amortization up over the first 5 years to from 70 to 90 percent, and those facilities have been built now for the most part for in excess of the 5 years.

Mr. KIMBALL. No.

Mr. HARDY. They are not?

Mr. KIMBALL. We usually get 50 or 60 amortization certificates over 5 years.

Mr. HARDY. Sometime furnish us, if you will, that figure of the depreciation which has been taken on your plant and equipment.

Mr. KIMBALL. Surely.

Mr. HARDY. On the Sacramento plant.

Mr. KIMBALL. As a matter of fact, that is one reason we put in more than our profits, because we put in the amount of our profits plus the amount of amortization and depreciation each year.

Mr. HARDY. That gives you an opportunity to build up your invested capital a little bit faster without having to put in any more actual cash of your own.

Mr. KIMBALL. It does that. But we are still putting it all back in.

Mr. HARDY. One of these days you will get the benefit of it.

Mr. KIMBALL. I hope so.

Mr. HARDY. I hope so, too. But I want to see Uncle Sam get as good a benefit out of these general propositions as we can.

Now, with respect to the Government facilities, I understand this matter of an option for acquisition of the land. Now, is the Government facility so located that it is easily separable from the Aerojet facility?

Mr. KIMBALL. It is completely separate.

Mr. HARDY. Well, sometimes we have found such facilities are completely separate but we have occasionally had the problem of access—ingress and egress. You have no such problem as that?

Mr. KIMBALL. No such problem. That is very definitely provided for in the contract.

I would like to invite this committee to come out and visit our Sacramento facilities. I think it would be a very useful time spent.

Mr. MILLER. I would like to accept the invitation—if my friend will yield.

Mr. HARDY. I am sure it would be time very well spent, if we can find the time. We have a little trouble in that regard. And we might also be accused of accepting hospitality. [Laughter.]

Mr. HÉBERT. You won't pick up the hotel bills, will you?

Mr. KIMBALL. No, we won't pick up the hotel bills, but we will buy you lunch in our cafeteria, because it is a very well-run cafeteria.

Mr. CUNNINGHAM. It is not cold enough out there for overcoats, is it? You don't need to wear an overcoat?

Mr. KIMBALL. No coats.

Mr. MILLER. Not at this season of the year.

Mr. HARDY. You all are distracting me.

I want to get back to these facilities for a second. Are these two plants served by the same utilities?

Mr. KIMBALL. Yes.

Mr. HARDY. So that there would be a problem of separating the utilities if the plants were separated?

Mr. KIMBALL. No, not the—we get power from a common source, from the P. G. & E.

Mr. HARDY. We had not too long ago a disposal project of an industrial plant, and we found that we couldn't sell two separate plants performing separate functions because the utility lines were all tied together and the cost of separating them would be prohibitive. I was wondering if we might have such a situation as that developing here.

Mr. KIMBALL. I would like to have Mr. Zisch answer that question. He has some information.

Mr. ZISCH. Actually, the Navy went to a great effort to provide against the very specific thing that Mr. Hardy is asking about, and that is, very specifically, they have established the conditions under which the Government, the United States Navy, would acquire the property in the event they desired to do so, as well as any part of our activity that might, in their judgment, complement the activities so that it would be an operating unit. And the essence of this results in the determination finally being made by the Secretary of the Navy as to what the terms of this arrangement will be.

Mr. HARDY. You mean terms of the separation?

Mr. ZISCH. Terms of the—the price of acquiring——

Mr. HARDY. That doesn't cover the point that I was trying to understand. For instance, are the Government facilities and the Aerojet facilities served by the same power source?

Mr. ZISCH. Yes.

Mr. HARDY. Are they served by the same steam source?

Mr. ZISCH. Yes.

Mr. HARDY. Who owns them?

Mr. ZISCH. In the case of the power and the basic utilities, these are owned by the company.

Mr. HARDY. And if the plant were separated, the Navy would have to provide a supplemental source for these utilities, in order to operate its plant?

Mr. ZISCH. Not necessarily. The arrangements are provided that could be made so that they could continue to acquire these services.

Mr. HARDY. Well, of course, all of these things get pretty involved. I am sure the gentleman from Iowa and the gentleman from South Carolina, Mr. Rivers, recall that we have had this kind of a problem.

Mr. KIMBALL. I remember some of them very well.

Mr. HARDY. In other cases. And it has been pretty disturbing. Sometimes we found we couldn't economically separate the facilities, although they were originally intended to be so separated eventually, and we were in the position where we had only one prospective customer, and that is the fellow with whose plant we were scrambled.

Mr. ZISCH. I might volunteer that the Navy went to great extent to advise us of such circumstances they were aware of, and they were provided themselves against the same thing occurring in the plant at Sacramento.

Mr. HARDY. I am pretty sure that the Navy wouldn't intentionally get itself into a position that would be extremely difficult, but it has sometimes gotten itself into some awful ones without doing it on purpose.

Mr. ZISCH. I see.

Mr. HARDY. And I am hoping we are not in that kind of shape here.

That is all, Mr. Chairman, for the present.

Mr. HÉBERT. Mr. Rivers.

Mr. RIVERS. Mr. Kimball, I think Mr. Hébert and Mr. Hardy have gotten the plant and the facilities questions pretty well resolved.

Now, let's compare our position now with World War II. We are in, really, the same sort of a position from the animus of the Department of Defense. It is a crash program, isn't it? After sputnik went up, it is a crash program.

Mr. KIMBALL. That is right. Polaris is a crash program.

Mr. RIVERS. That is what I say. After the sputnik, everybody in the Defense Department—and everybody else on earth, including the man on the street, demanded that we get into the missile business full speed.

So your company is the largest in the Nation where you can turn for the experimentation, for the research and development, on this type of missile?

(Mr. Kimball nods.)

Mr. RIVERS. Or the solid propellent. And I think you said the liquid propellent?

Mr. KIMBALL. Both.

Mr. RIVERS. So 85 percent of your production is research and development; is that right?

Mr. KIMBALL. That is correct.

Mr. RIVERS. You have roughly 3,000 scientists and engineers?

Mr. KIMBALL. That is correct.

Mr. RIVERS. I think your testimony said that?

Mr. KIMBALL. That is right.

Mr. RIVERS. I remember during the war—I was on the old Naval Affairs Committee—when your company developed the JATO. And we rejoiced at that. I think Doolittle took off that carrier with it, didn't he, in those 25's?

Mr. KIMBALL. No, they weren't ready at that time.

Mr. RIVERS. Well, whatever it was.

Mr. KIMBALL. Yes.

Mr. RIVERS. You had it pretty shortly thereafter?

Mr. KIMBALL. They used them—as a matter of fact, we have made something over 500,000 of them.

Mr. RIVERS. I know it. And from that company, which was a band of scientists, has grown the present Aerojet; is that correct?

Mr. KIMBALL. That is correct.

Mr. RIVERS. Now let's find out what we are doing now. What is your contribution now? You got your plant. You are located. Now let's talk about the affirmative side of it. Where do we go from here? How is your Polaris proceeding?

Mr. KIMBALL. It is coming along very well. As a matter of fact, we are ahead of schedule.

Mr. RIVERS. Is it ahead of schedule 1 month?

Mr. KIMBALL. No. I think it is ahead of schedule about a year and a half, of the schedule that was projected 3 years ago.

Mr. RIVERS. I thank you for that. I didn't know whether that was classified—18 months ahead of schedule.

So the thinking that had gone on prior to the originating of the contract has been really implemented 18 months into the future, roughly?

(Mr. Kimball nods.)

Mr. RIVERS. So you can see now in the future where you may be able to put these things into production?

Mr. KIMBALL. That is right.

Mr. RIVERS. You don't know what that date is and you don't want to make that known, but that day is not far hence?

(Mr. Kimball nods.)

Mr. RIVERS. Now let's get to Indian Head. Is there any competition between you and Indian Head?

Mr. KIMBALL. Their facilities are different from ours.

Mr. RIVERS. It is a different proposition, isn't it?

Mr. KIMBALL. They essentially make double-base powders down there.

Mr. RIVERS. That is what I say. That is a powder plant. Yours is an experimentation plant?

Mr. KIMBALL. Well, ours makes a composite propellent which was originated by our company. Now, I may say that France and England have never built composite propellents, so they are many years behind us now, because all the business was done in government arsenals.

Mr. RIVERS. So the commodity which you build is strictly your commodity?

Mr. KIMBALL. We developed it.

Mr. RIVERS. And there aren't any competitors?

Mr. KIMBALL. That is right—we have some competitors. We have some other people in the same field.

Mr. RIVERS. Is it down Indian Head?

Mr. KIMBALL. No.

Mr. RIVERS. That is what I am getting at. Has the Government any of it?

Mr. KIMBALL. No.

Mr. RIVERS. Well, when you get your Polaris completed, can Indian Head provide the production for it?

Mr. KIMBALL. Well, you would have to set up for it wherever they wanted to set up, if they want production.

Mr. RIVERS. Do they have to retool?

Mr. KIMBALL. Oh, yes, surely.

Mr. RIVERS. So there isn't any competition between you and Indian Head?

Mr. KIMBALL. That is correct.

Mr. RIVERS. What about your other propellents and motors, and things, which you make; you said they are 25 in number, by way of rockets and motors?

Mr. KIMBALL. About 25 different solid propellent engines we are making.

Mr. RIVERS. Do you have any competitors in those?

Mr. KIMBALL. Some.

Mr. RIVERS. Do you have any competitors in those?

Mr. KIMBALL. Very few.

Mr. RIVERS. They are mostly of your own creation?

Mr. KIMBALL. That is right. The things that we make there we developed there. We don't make anything there that somebody else originates.

Mr. RIVERS. I know something about your background, Mr. Kimball. I know you are an engineer. I think one time you told me you lost your finger in an automobile engine?

Mr. KIMBALL. Being a bad engineer then. [Laughter.]

Mr. RIVERS. You are one of the few people ever to be in Washington who knew what you were doing when you were talking to engineers.

I recall when you were Secretary of the Navy. I recognize Mr. Hardy's questions, which were cognizant of your fine background.

Now, what about your competitors; aren't they, too, financed by the Government?

Mr. KIMBALL. Surely.

Mr. RIVERS. Because the Government is the only people in this business, this rocket business?

Mr. KIMBALL. There is no place else you can sell these rocket engines, except to the Government.

Mr. RIVERS. In this outer space business.

So necessarily, the only customer you can have is the United States Government?

(Mr. Kimball nods.)

Mr. RIVERS. Nobody else in this business.

Now, when you get in business full-speed and your Polaris is in full speed and operational, and you are making money in it, assuming you do most of the production, would not your profits be renegotiable?

Mr. KIMBALL. That is for sure.

Mr. RIVERS. That is for sure. Therefore, you are reluctant to get out here and declare too many big dividends. I think we know something about that. Isn't that right?

Mr. KIMBALL. That is right.

Mr. RIVERS. Is that what goes on in your mind?

(Mr. Kimball nods.)

Mr. RIVERS. Is that what goes on in your mind, too?

Mr. ZISCH. Yes, sir.

Mr. RIVERS. Have you been renegotiated recently?

Mr. ZISCH. Yes, sir.

Mr. RIVERS. Has that been a pleasant undertaking?

Mr. ZISCH. No, sir.

Mr. RIVERS. You don't want that to happen all the time, do you?

Mr. KIMBALL. We are renegotiated and redetermined and relooked at every few minutes.

Mr. RIVERS. I hope you are reelected.

I am not afraid to ride out in California in your plane. And I am not afraid of your paying for my food when I get there. Because I face the people in South Carolina every 2 years.

Mr. KIMBALL. I might say, Mr. Chairman, I have had some very fine hospitality from Mr. Rivers down in his hometown.

Mr. RIVERS. Yes, sir. It is your turn to entertain me, now.

Mr. KIMBALL. He gave me food. I didn't give it to him.

Mr. RIVERS. That is right.

The point I am getting at is this, Mr. Kimball, and I am not facetious. In your business and your competitors who are in this similar business—because you can't have one contractor; you have to have different minds going on all the time. Primarily, your business is with the Government?

Mr. KIMBALL. That is right.

Mr. RIVERS. And it is your business to get the business—as we Confederates say, "get there fustest with the mostest." We did that for the longest.

Now, your motors which you are making for the Air Force: Are most of those in production or still in the X stage?

Mr. KIMBALL. Both. Few of them in limited production. Most of them in research and development.

Mr. RIVERS. Which is the largest motor you make for the Air Force, by way of solid propellent? Is that classified?

Mr. KIMBALL. Well, I think those figures are classified. I will be happy to give them to you——

Mr. RIVERS. For the Army, is that classified?

(Mr. Kimball nods.)

Mr. RIVERS. Who else you got it with? With the Post Office? I don't suppose they have anything that is classified?

Mr. KIMBALL. We are making some automation handling equipment for them, which I think we can make pretty well.

I might read you a list of some of the different items that we are working on, that are not classified.

We are making the JATO unit.

We are making a booster.

We are making a Sparrow Sustainer.

A Regulus booster.
A solid propellent powerplant for a drone.
An Air Force motor for the Ding-Dong missile.
We are making a booster for the B–52.
The T–45 warheads for the Nike.
Pressure switches.
Infrared sights for aircraft.

Mr. RIVERS. You have gotten——

Mr. KIMBALL. That is just a few of the things.

Mr. RIVERS. You got me confused enough. Let me ask you this question. What are you doing for the B–52? Making a booster?

Mr. KIMBALL. Making an assisted takeoff booster for emergencies, that they could use.

Mr. RIVERS. Emergency use; similar to JATO?

Mr. KIMBALL. Yes.

Mr. RIVERS. And the largest motor which you make for the Air Force, is that operational now?

Mr. KIMBALL. No, it is still in the research and development stage, but they are being operated, yes, they are.

Mr. RIVERS. Are you the first company to control solid fuels consumption?

Mr. KIMBALL. We originated the present propellent we are making in this country.

Mr. RIVERS. We have been told that it is easy to control, or easier to control, the cutoff point of liquid propellent.

Mr. KIMBALL. No. We can cut off the solids wherever we want to.

Mr. RIVERS. But, with the solid, it is like a firecracker that is going to blow up or not?

Mr. KIMBALL. You can't start—stop a solid and start it again.

Mr. RIVERS. Yes; that is what I am talking about.

Mr. KIMBALL. But you can exactly determine the time you want to stop it, within several millionths of a second.

Mr. RIVERS. But, once it starts, you can't start it up again?

Mr. KIMBALL. Yes.

Mr. RIVERS. But you can do it with the liquid?

Mr. KIMBALL. Yes.

Mr. RIVERS. But you have come nearest to what I said, in starting and stopping it, or doing that same effect?

Mr. KIMBALL. No; I don't think——

Mr. RIVERS. Or getting that same effect.

Mr. KIMBALL. No. We can start them, and we can stop them, but we can't start them and stop them and then start them again in solids. We can in the liquids.

Mr. RIVERS. But you can determine how far it will go with that solid capsule, or whatever it contains?

Mr. KIMBALL. Exactly.

Mr. RIVERS. Now, has anybody else been able to do that before?

Mr. KIMBALL. I think we are the first ones that have ever been able to get a very definite cutoff point.

Mr. RIVERS. Can the Polaris missile be shot from other than a submarine?

Mr. KIMBALL. Surely.

Mr. RIVERS. Is it compatible to land and sea and air?

Mr. KIMBALL. It can be shot from that.

Mr. RIVERS. Its prime use now, though, is on a submarine?

Mr. KIMBALL. Submarine. That is the Navy's wish, and that is what we are designing it for.

Mr. RIVERS. Does it go—well, I will stop there. Your contract with the Navy is how much, Mr. Secretary?

Mr. KIMBALL. I can't give you the exact figures. I think they are classified, anyhow. I would be happy to put them in the record.

Mr. RIVERS. Is it an indeterminate contract? When you stop, can you ask for more money and get it?

Mr. KIMBALL. Well, we have a statement each year as to what our work statement will be, and we give them an estimate of what that will cost, and then they will tell us whether they can get that fund or not.

Mr. RIVERS. I see.

Mr. KIMBALL. And that, in turn, extends the work.

Mr. RIVERS. Do you see the termination of the research and development contract on Polaris?

Mr. KIMBALL. Yes; we will have fairly rapidly Polaris units in operation. Now, I don't see any termination for it, because, as we get the first one operational, the second one is going to be better, and the third one will be better.

Mr. RIVERS. That is right.

Mr. KIMBALL. We will get the performance up every year.

Mr. RIVERS. From all accounts, is the Navy satisfied with your performance?

Mr. KIMBALL. I think they are quite happy with it. They are ahead of where they thought they might be.

Mr. RIVERS. Will you, by this unexpected success, have saved the Navy money?

Mr. KIMBALL. I am sure we have. And I am sure—two things that I think have helped the Government immensely. One is that a private establishment, such as ours, we get business from all branches of the Defense Department. We have 4 or 5 agencies of the Navy, 8 or 10 agencies in the Air Force, and other agencies in the Army, and the research that we do for one helps the other.

Mr. RIVERS. Well, in the future——

Mr. KIMBALL. Plus the fact that, if we don't think the services are doing the research in exactly the right field, we put some of our money in it to prove that we are right and they should go along with us.

Mr. RIVERS. And you have done just that in your company?

Mr. KIMBALL. That is right.

Mr. RIVERS. Do you deal primarily with this research department of the Defense Department, or will you, in the future, the one that was set up here recently?

Mr. KIMBALL. We deal with all the different agencies in the Government.

Mr. RIVERS. I know. But the one that was set up recently?

Mr. KIMBALL. The Advanced Research Projects Agency.

Mr. RIVERS. What is that, John?

Mr. COURTNEY. ARPA.

Mr. LANKFORD. Advanced Research Projects Agency.

Mr. KIMBALL. They asked us to come over. We made them a full presentation of our capabilities 2 weeks ago.

Mr. RIVERS. Do you plan they will utilize your facilities?

Mr. KIMBALL. I would think they would. I would think we would have some things that would be very useful to them.

Mr. RIVERS. Mr. Chairman, I have nothing more.

Mr. HÉBERT. Mr. Miller.

Mr. MILLER. I think the field is pretty well covered, although I would like to say this: The fact that we are about 18 months ahead of time on Polaris—that isn't only Mr. Kimball's, but Admiral Raborn's testimony.

Mr. RIVERS. And, also, Admiral Rivers. [Laughter.]

Mr. MILLER. That is a very commendable thing, because I believe that time is of the essence in this particular thing. The thing that you want to buy most is time, and they have delivered time.

I have no further questions.

Mr. HÉBERT. Mr. Lankford.

Mr. LANKFORD. Thank you, Mr. Chairman.

Mr. Kimball, I want to direct some questions. You seem to have—at least, I gathered from your opening statement that this is not a fight between Indian Head and Aerojet, nor is it brought about simply because of layoffs at Indian Head. It is perfectly true that my interest was generated initially because of layoffs in Indian Head, but I think it goes far beyond Indian Head and Aerojet. It goes into the question of whether the Government is making the most economical use of Government-owned facilities, Government owned and operated plants. So, I don't want you to think that this Aerojet is being picked on because of the layoffs—only because of the layoffs at Indian Head. And I want to assure you—I am glad to hear that you said that this was not a politically inspired thing.

Mr. KIMBALL. No.

Mr. LANKFORD. That we had to have something to talk about. Because I was the one that started the whole business.

Mr. KIMBALL. Mr. Lankford, I think when the production on Polaris units, or other units, gets beyond what we do out there, I think the first place we should look to put them is in Government plants, where the Government has a large investment, and you could put those in production cheaper than you could if you started with bare land.

Mr. LANKFORD. Well, I am happy to hear you say that, sir. And another thing I want to say is that I want to commend Aerojet and Admiral Raborn for the progress that has been made in Polaris. I think it has been fine. And there is no quarrel about that. Perhaps it was necessary to do it that way at the time.

Now, in the Aerojet Booster of April 1958, there was a little squib that said you had gotten $1,500,000 contract from the Air Force. Does that deal with Minuteman, Mr. Kimball?

Mr. KIMBALL. It was the preliminary work on Minuteman.

Mr. LANKFORD. Will there be any need for any construction to carry on this work?

Mr. KIMBALL. No. That work we are already doing. No; that was in the field of developing better propellents.

Mr. LANKFORD. Yes, sir. But was any additional construction at either your Azusa or Sacramento plants needed to carry on this work?

Mr. KIMBALL. We did that in our own laboratories.

Mr. LANKFORD. You did. There was no——

Mr. KIMBALL. We put in quite a considerable amount of money for additional laboratories in Sacramento because we saw a continuing need for developing better propellents. We have quite a large chemical group up there, and some brandnew facilities.

Mr. LANKFORD. But there was no additional construction needed to carry on this work for the Air Force?

Mr. KIMBALL. No. Not enough contracts.

Mr. LANKFORD. According to the last issue of Space Age News, Aerojet is forerunner—is running in front to get the propulsion end of Minuteman.

Mr. KIMBALL. I hope so.

Mr. LANKFORD. If Aerojet is successful in this endeavor, will it need additional facilities?

Mr. KIMBALL. Yes.

Mr. LANKFORD. In what amount, sir?

Mr. KIMBALL. I can't give you the amount offhand. It will depend on the size of the effort. We will need some additional facilities which we will put in and which the Government will put in partly, too.

Mr. LANKFORD. These will be additional facilities provided partly by Aerojet and partly by the Government—new, brandnew facilities.

Mr. KIMBALL. We have put in part of the facilities that are affixed to the ground and we have asked the Government to help us with equipment that they can move out, severable.

Mr. LANKFORD. That brings me down to my next point. In the manufacture of composite propellents, does Aerojet now have a continuous mixing process?

Mr. KIMBALL. We just finished designing one.

Mr. LANKFORD. You have. Was that designed with Federal money or with Aerojet money?

Mr. KIMBALL. No. We designed it with our own money.

Mr. LANKFORD. Were studies of this——

(Mr. Zisch, aside to Mr. Kimball.)

Mr. KIMBALL. Go ahead.

Mr. ZISCH. In addition to the initial effort being undertaken by the company with its own funds, Admiral Raborn has supported some more refined effort with respect to the continuous mix process.

Mr. LANKFORD. And this was in the nature of a study by your scientists?

Mr. ZISCH. Yes, sir.

Mr. KIMBALL. Study and design.

Mr. LANKFORD. How much was contributed by the Federal Government for these studies?

Mr. ZISCH. I am unable to recall that.

Mr. LANKFORD. Was it in the neighborhood of $600,000?

Mr. ZISCH. I just was given the information that the number is classified. But it is somewhat less than your number you stated.

Mr. LANKFORD. The amount of money for study is classified?

Mr. KIMBALL. I think these contracts—we want to give you all this information, but I think to look after security some of these things we are going to have to ask to handle on a classified basis.

Mr. ZISCH. We can give it to you later.

Mr. LANKFORD. Then, will you supply that figure for the record?

Mr. KIMBALL. Yes.

Mr. LANKFORD. You are in the process or are intending to install this continuous mix process?

Mr. KIMBALL. That is right.

Mr. LANKFORD. That will be done by whom; that is, financed by whom?

Mr. KIMBALL. Financed by the Government, partially.

Mr. LANKFORD. Is the amount of that classified, too?

Mr. KIMBALL. I can't tell you what it is, Mr. Lankford, really. I just can't keep all these figures in my mind. We will get it for you and give it to you.

Mr. LANKFORD. I would appreciate it if you would.

Now, it was testified here—you said when you were talking with Mr. Rivers, that you all were pioneers in the field of composite propellents; is that correct?

Mr. KIMBALL. That is correct. We started it.

Mr. LANKFORD. Well, it was testified here yesterday, I believe, by Admiral Stroop, that actually the Thiokol Corp. was the first to manufacture composite propellents?

Mr. KIMBALL. No. I think Thiokol started to manufacture composite propellents several years after we did. However, they have been in the business a long time and are a very good company.

Mr. LANKFORD. Well, there is some conflict in testimony there. Your composite propellent, as I recall it, was called a first cousin to Thiokol.

Mr. KIMBALL. No. I think we had the first. I think we can establish that. Which isn't important, because it was 10, 12, or 15 years ago.

Mr. LANKFORD. Well, the only thing——

Mr. KIMBALL. Yes. I might have Mr. Zisch reply.

Mr. LANKFORD. Yes.

Mr. ZISCH. I had the privilege of being associated with the California Institute of Technology at the time the group started Aerojet, and I am very immediately aware of the chronological events, and I can express confidently that the initial composite propellent work originated at Caltech, under the guidance of Dr. von Karman. When the company was established at the request and as the result of discussions between Von Karman and General Arnold, we undertook further development in production of composite propellents, and it was some years later that the same organization, Caltech, did basic development work on the Thiokol type propellent, purchasing from the Thiokol Chemical Corp. the polysulphide to make this propellent, and subsequently therefore to this the Thiokol Corp. entered into the rocket propellent work, which was some years later than Aerojet's effort in production and development in the composite propellent field.

Mr. LANKFORD. Well, actually, I was leading up to something else. I believe Mr. Kimball was quoted in the press as saying that Indian Head powder factory didn't have the know-how or the ability to produce composite propellents. That may not be so. However, I was wondering, Mr. Kimball——

Mr. KIMBALL. They could learn, of course.

Mr. LANKFORD. If you were familiar—yes, I agree with you, they could learn, had they been given the tools to work with. I feel quite strongly about this.

Mr. KIMBALL. Well, it is more than the tools. It is also the people.

Mr. LANKFORD. But you have to have a test tube before you can start an experiment. I was wondering, sir, if you were familiar with the great contributions that have been made by the Indian Head Powder Factory in the control of the rate of burning of solid propellents. I am speaking now of double-base propellents.

Mr. KIMBALL. The whole propellent field is a continual study to control the rate of burning and to change it—increase it or decrease it, depending on the job you have.

Mr. LANKFORD. You are aware of the work they have done?

Mr. KIMBALL. They have done a lot of work, and it is pretty good.

Mr. HÉBERT. Mr. Courtney.

Mr. COURTNEY. One of the members, Mr. Kimball, has asked for the origin, for the history and origin of Aerojet General Corp., and its predecessor, Aerojet Co. Now, I have not yet, in the brochure which you have handed the committee, found that information.

The member has asked that the original capitalization of Aerojet and the circumstances of its creation and the financial transactions running up to and through the time it become the present company, Aerojet-General——

Mr. KIMBALL. I think we better cover that in a complete letter so you have all the facts.

Mr. COURTNEY. In a complete letter, so all the facts will be available, in answer to the member's inquiry.

Mr. KIMBALL. And I think, Mr. Chairman, I would also like to send you for the record a list of the controls and the way that Aerojet and General Tire operate, so you will have the complete story on that. I would like to put that in the record.

Mr. HÉBERT. I think that would be very helpful, because there is a little confusion existing now as to where one meets the other.

Mr. COURTNEY. Mr. Kimball, we have—with that information to be supplied at your convenience, most of the questions which I had to ask will be answered.

Mr. KIMBALL. Yes.

Mr. COURTNEY. I have this question, however, with reference to your technical personnel. This appears under the tab of the same name, on page 1. Roughly, I count up 2,700 personnel, of various technical categories and competence.

On yesterday, Admiral Raborn testified—and I think I have the correct figure—that when the decision was made to award the Polaris contract to Aerojet-General for development at Sacramento, that one of the considerations was that you had 479 scientists of the competence which he said were required for that program?

(Mr. Kimball nods.)

Mr. COURTNEY. The first is this. Do the 2,700 people who are enumerated on page 1 refer to personnel involved in the Polaris program?

Mr. KIMBALL. Yes. The total scientific program that we have—Polaris is only a part of our different programs. That would cover the five or six hundred technical people that are working on Polaris.

Mr. COURTNEY. This is all, then, and not directed to——

Mr. KIMBALL. This is all. Not particularly directed to Polaris. It is all.

Mr. COURTNEY. This is all.

How many were required to augment the 479 personnel, specialized personnel? If you can think of it readily? And if you can't, you can supply it for the record.

Mr. KIMBALL. We will have to supply that figure.

Mr. COURTNEY. Were added to complete and carry on the Polaris program. And while you are at it, we would like to know whether they were recruited locally or whether they came from other parts of the country.

Mr. KIMBALL. They came from all over the country.

Mr. COURTNEY. All over the country.

You carry on a continual program of recruitment, do you, Mr. Kimball?

Mr. KIMBALL. We do it with the different universities and technical colleges around the country. We get them all the time.

Mr. COURTNEY. And by advertisement in the metropolitan dailies all over the country?

Mr. KIMBALL. Some. Mostly by word of mouth. In fact, we have a lot of people of the caliber of Dr. von Karman and Dr. Millikan in our group. They sort of attract lots of other scientists to come there.

Mr. COURTNEY. In other words, the quality of personnel and their associates naturally attract others; is that your position?

Mr. KIMBALL. That is right. This is a rather new field. It is a new horizon, an interesting field. So a lot of young fine scientists want to come to us.

Mr. COURTNEY. The question that is always asked in these circumstances, and particularly in the airframe inquiry and in the engine inquiry conducted by the committee, is the number of retired military personnel.

Mr. KIMBALL. I can't give you that figure.

Mr. COURTNEY. And their particular responsibilities.

Mr. KIMBALL. But I will tell you what our philosophy is on it.

Mr. COURTNEY. You may supply that for the record.

Mr. KIMBALL. Any retired military people that look to us—that come to us for a job and they have abilities that we can use; we like to hire them.

Mr. HÉBERT. Do you solicit them?

Mr. KIMBALL. No. We don't solicit anybody until after they are retired; when they are retired and come to us and ask for a job and we have something that they can do and their talents fit what we need.

Mr. HÉBERT. But you do not make it a practice to solicit people before they are retired?

Mr. KIMBALL. No. After they retire and they come to us, then we give them a job, if we can use them, if they fit in with our work.

We obviously can't use more than 1 out of 20 that apply.

Mr. COURTNEY. Mr. Kimball, the indications are that Captain King, who was lately commander of the Indian Head naval powder factory, retired on June 30, 1958, and it was publicly announced that prior to the date of his actual retirement he was to enter the employ of Aerojet Corp.—Aerojet-General.

Would you tell the committee the circumstances under which that arrangement, if it was an arrangement, was made prior to his retirement?

Mr. KIMBALL. I don't know Captain King. I think Mr. Zisch can tell you. He is going to be the safety engineer for us.

Mr. COURTNEY. Mr. Zisch.

Mr. ZISCH. As you may have read in the papers, in the last couple of years we have had some very serious explosions in mixing this highly sensitive propellent in advancing and pressing the state of the art.

Mr. COURTNEY. You are speaking of the composite propellent?

Mr. ZISCH. That is right. And this was an extremely serious concern to our whole program, and especially to the matters of interest to the Bureau of Ordnance and Admiral Raborn. And we realized that we had to strengthen even further our understanding of the safety questions.

As a consequence, the manager of our solid propellent rocket plant and the head of the propellent development group embarked on a program to obtain the very best talent that they could for this safety effort. And there are only a few activities in this country that have this type of personnel available, such as the very few companies in hazardous explosive type work.

We found that these men were considered extremely valuable and were not available for employment. It was suggested to us by the Navy that there was an officer that was retiring and he, at his own expense, came out and applied for the job and was interviewed, and arrangements were made to employ him, in charge of safety at the Sacramento plant.

Mr. COURTNEY. Now, when were the conversations leading to his employment held?

Mr. ZISCH. Some 60 to 90 days prior to his separation from the service.

Mr. COURTNEY. And it was because of his technical know-how in the field of safety engineering?

Mr. ZISCH. Correct.

Mr. COURTNEY. That it was suggested he be employed by your company?

Mr. ZISCH. Correct.

Mr. COURTNEY. Are we to understand from your statement this morning that the origin of your arrangements with Captain King were in the Navy Department, or were they generated among your own personnel?

Mr. KIMBALL. I don't think—he found out—excuse me.

Mr. ZISCH. To the best of my knowledge—go ahead, then.

Mr. COURTNEY. I didn't get your answer.

Mr. KIMBALL. He found out we were looking for safety people. I don't think we knew Captain King. He came out and said he understood we needed some safety people and he applied for the job. They apparently liked him and hired him. I don't know him myself.

Mr. ZISCH. None of those associated with hiring him had ever seen him before.

Mr. COURTNEY. Then the solicitation was by him, rather than by your company?

Mr. ZISCH. That is correct, yes, sir.

Mr. COURTNEY. And after inquiry into his background, you then made the engagement which results in his present employment?

Mr. ZISCH. Correct.

Mr. COURTNEY. Now, did the know-how which he possessed develop because of his identification with the Indian Head powder factory?

Mr. ZISCH. That was included, the fact that he was an ordnance officer and had experience with handling ammunition and explosives and hazardous materials throughout his Navy career.

Mr. COURTNEY. Now, had there been any other retired personnel or retiring personnel come to your attention in like manner and are they about to be employed by your company?

Mr. KIMBALL. I don't think we could answer that.

Mr. ZISCH. I don't know.

Mr. COURTNEY. You don't know.

Mr. KIMBALL. We have a continuing list of people that write us for jobs, saying that they have retired or are going to retire, and we look at them.

Mr. COURTNEY. Now, the next question dealing with your scientific personnel and your recruitment program, dealing especially with the scientists. What is the rate of turnover, if you have it readily available, of this type of personnel annually or by any other measurement?

Mr. ZISCH. We would have to supply the specific number. I can report that it is very low compared to the statistics that are derived for similar——

Mr. COURTNEY. This is general information that has a bearing on the committee's interest in recruitment costs and program.

And I say to you, generally in the airframe inquiry it was found that this class of personnel had a turnover rate of roughly 17 percent, on the average.

Mr. KIMBALL. Oh, our rate—if it was 5 percent I would be surprised. They very seldom leave after they come to us.

Mr. COURTNEY. That brings me to the second question, if you have the information available, and that is the recruitment costs. If you have them in such form as would be identifiable as recruitment costs?

Mr. KIMBALL. We have. We could get you that information.

Mr. COURTNEY. So we may know the costs of these movements and transfers in the experience of your company.

Mr. KIMBALL. Yes. The costs, when you get people from the Middle West, to move them out there, is quite large.

Mr. COURTNEY. Yes.

Mr. KIMBALL. That is the reason we run them through a very exact screening test, because we don't want to hire someone that is going to be there 6 months or a year and leave.

Mr. COURTNEY. Yes. Then the practice of the company, I would take it, is what is uniformly the case: their moving expenses involved and perhaps other additional expenses or moneys of some kind, all of which have a bearing on the costs of performing these contracts?

Mr. KIMBALL. That is right.

Mr. COURTNEY. Is that right?

Mr. KIMBALL. That is right.

Mr. COURTNEY. Could you supply the information for the record?

Mr. KIMBALL. Be very happy to.

Mr. COURTNEY. For the committee here, on the experience of your company in that field?

(Mr. Kimball nods.)

Mr. COURTNEY. Now, taking, then, the second category, and that is the nontechnical or the skilled workmen, we would like to have the benefit of your experiences on that, as to wage rates, turnover, and recruitment costs, if they are identifiable.

Mr. KIMBALL. They are identifiable.

Mr. COURTNEY. In your plant.

Mr. KIMBALL. In the nonskilled rates—nonscientific people, mostly we get those locally in California. The ones that want to come out there from the East or from the Middle West: We don't pay their moving expenses. They have to come on their own steam.

Mr. COURTNEY. Well, there is a floating labor market of that kind; is that it?

Mr. KIMBALL. Yes. We get quite a few people from the aircraft plants in Los Angeles that want to get—they like the Sacramento area better than they do Los Angeles, for various reasons. I did want Mr. Miller to know that. He——

Mr. COURTNEY. This plant, I think, of yours is located accessibly to the residential area of Sacramento?

Mr. KIMBALL. That is right.

Mr. COURTNEY. Is it not, by something like 30 minutes, or 40 minutes?

Mr. KIMBALL. Sixteen miles east of Sacramento. The American River is there and the people that work there live on the other side of the river; 15 to 30 minutes to get to work.

Mr. COURTNEY. And did that have some influence or bearing on your selection of the site, plus the other——

Mr. KIMBALL. Yes, because we had to go somewhere where our people would like to live and would enjoy it and could get to work quickly. There were lots of sites that we could get, but you couldn't get people to live there.

Mr. COURTNEY. Now, there is a great deal of material in this brochure which you have handed us, Mr. Kimball, which answer a great many of the questions which will be asked this morning. There may, however, be some omissions. I would like the privilege of submitting questions to you on concerns of the committee in written form, to be answered as you propose to answer these others.

Mr. KIMBALL. Be very happy to.

Mr. COURTNEY. After the material will have been examined.

Mr. KIMBALL. We may have given you a little too much. We thought we better err on that side, rather on the other.

Mr. COURTNEY. We have also, I think, the financial statement of the company. I believe Mr. Hardy has that.

Mr. KIMBALL. Yes.

Mr. COURTNEY. That is here. Thank you, we have one.

Mr. KIMBALL. Here is our last year's.

Mr. COURTNEY. Thank you very much, Mr. Kimball. [Aside to the Chairman.]

Mr. HÉBERT. Thank you very much—is there anything you want to add, Mr. Kimball?

Mr. KIMBALL. I don't know of a thing, sir. I do want to make this a matter of the record, the arrangement between Aerojet and General Tire, but which we will give you a detailed statement on, as to what the arrangement is between the two companies and how they operate.

Mr. HÉBERT. We want that for the record.

Mr. COURTNEY. That is right.

Mr. KIMBALL. You will have that.

Mr. COURTNEY. That is to be supplied in detail and in writing.

Mr. KIMBALL. Yes.

Mr. HÉBERT. Thank you very much, Mr. Kimball, for your cooperation this morning.

The committee will now go into executive session, as outlined at the opening of the hearing.

Mr. COURTNEY. And recess the public hearing subject to call.

Mr. HÉBERT. The public hearings are recessed, subject to call of the Chair.

(Whereupon, at 11:30 a. m., the committee proceeded in executive session.)

(The statement referred to for inclusion in the record is as follows:)

AEROJET-GENERAL CORP,
Azusa, Calif., July 25, 1958.

SPECIAL SUBCOMMITTEE FOR INVESTIGATIONS, COMMITTEE ON ARMED SERVICES,
House of Representatives, Washington, D. C.
(Attention: Mr. J. J. Courtney, special counsel.)

GENTLEMEN: Enclosed is a copy of the transcript of the testimony of July 11 which has been edited as suggested by Mr. Courtney in his letter of July 14. Our corrections appear in ink on pages 110, 112, and 135.

I would also like to complete the records of the hearings by supplying additional information about Aerojet-General Corp., its finances, its facilities, and its personnel. The information offered in the following titled paragraphs is also identified by the page numbers of the stenographic transcript of the hearing of July 11:

Amortization of facilities (pp. 128, 129)

Mr. Hardy asked for the figures concerning accelerated and normal amortization on Aerojet facilities. The complete information on Aerojet facilities amortization at all of its locations is tabulated in enclosure 1.

Utilities at Aerojet, Sacramento plants (p. 132)

Our remarks on the ownership of utilities at our Sacramento solid rocket plant require clarification to correct and complete the record. You will recall that we have two basic plant designations for our Sacramento plants: the liquid rocket plant, under the cognizance of the United States Air Force; and the solid rocket plant, under the cognizance of the United States Navy.

The liquid rocket plant (with the exception of the manufacturing area, Air Force plant 70, which is wholly owned by the Air Force and erected upon land we have deeded to the Air Force) contains nonseverable facilities owned by Aerojet largely equipped by the Air Force. The utilities, including power and water lines, of a nonseverable nature are owned by Aerojet in the liquid rocket plant. The Air Force, however, erected its own utilities lines to its manufacturing plant, which is on Air Force land and is contiguous to and managed as a portion of our liquid rocket plant.

The solid rocket plant, which is under Navy control and contains both Aerojet and Navy facilities on Aerojet land long-term leased as well as optioned to the Navy, is supplied by power and water conveyed through utilities lines owned by

the Navy. Aerojet use of these facilities is limited to approvals by the Navy, and Aerojet use of power and water from these utilities for its own purposes must be paid back to the Navy at cost.

Large solid propellent engines (pp. 140, 141)

Mr. Rivers asked about the largest solid rocket Aerojet is working on for the Air Force. Enclosure 2 gives the comparative sizes of the large Navy and Air Force solid rocket engines. (Classified "Confidential.")

Government contracts at Aerojet (pp. 144 and 150)

Mr. Rivers asked for the amount of the Polaris contract at Aerojet. We also agreed that we would provide you with complete information on our contracts. Enclosure 3 contains a current listing of all Aerojet prime contracts and principal subcontracts or purchase orders under Government primes. Attached to enclosure 3 is a dollar summary for Polaris of the total contract value of the prime contract with the Bureau of Ordnance and the subcontracts with Lockheed Missile Systems division. (Classified "Confidential.")

Continuous mixing (pp. 149, 150)

The amounts of money thus far applied to the continuous mixing process for composite solid propellents at Aerojet are listed below:

Allocation by Aerojet-General	$108,515
Allocation by Navy under contract	540,000

For your added information, our current estimate of the cost to errect the minimum requirements for a continuous mixing facility with a capacity of 1 million pounds of propellent per month is $1,486,362.

Aerojet fiscal background (pp. 153, 154)

Mr. Courtney reiterated the question of Aerojet's financial history. This information is presented in enclosure 4.

General Tire relationship with Aerojet-General (pp. 154, 164)

The current relationship with the General Tire & Rubber Co. with its subsidiary Aerojet-General Corp., from a management and financial standpoint, is outlined below as agreed by Aerojet during the hearing:

The following services performed by the General Tire & Rubber Co., Akron, Ohio, on behalf of Aerojet-General Corp.

1. Overall corporate management, including salary and expenses of Dan A. Kimball, president of Aerojet-General, expenses of periodic visits by General Tire & Rubber Co. executive management personnel, such as William O'Neil, president and chairman of the board, and M. G. O'Neil, executive assistant to the president and vice president of the General Tire & Rubber Co., in connection with the formulation and administration of company policies.
2. Legal counsel and services in connection with:
   (*a*) Corporate matters.
   (*b*) Securities and Exchange Commission.
   (*c*) Tax matters.
   (*d*) Litigation.
   (*e*) Consultation and advice on corporate patent policy. Review of licensing agreements and arrangements.
3. Accounting:
   (*a*) Corporatewide policies and procedures.
   (*b*) Financing, assistance in obtaining working capital.
   (*c*) Review of Federal and State tax returns.
   (*d*) Assistance in renegotiation procedures.
4. Employee services and industrial relations:
   (*a*) Group insurance, including life, medical, surgical, and dependency coverages.
   (*b*) Retirement and pension plan administration and investment counsel.
   (*c*) Assistance in union negotiations.
   (*d*) Assistance in connection with safety and first-aid programs.
5. Insurance:
   (*a*) Administrative assistance.
   (*b*) Review of policies and coverages.
   (*c*) Volume purchasing under certain policies to reduce premiums.

6. Traffic department:
(*a*) Review of freight bills, filing of claims.
(*b*) Routings.
7. Technical assistance and advice in connection with industrial practices in the chemical and rubber industries.
8. Procurement: (*a*) Assistance and advice with respect to procurement of plastic and rubber materials.

The allocation of home-office expense from the General Tire & Rubber Co. to Aerojet-General Corp. has been reviewed annually by Government audit services and has been approved as reasonable and as an allowable cost under Government contracts. Such audits have developed the fact that a larger allocation could have been supported and approved. Monthly billings of this expense have been as follows:

Date and amount per month

Feb. 1, 1947	$3,000	Dec. 1, 1955	$27,500
Mar. 1, 1949	4,500	Dec. 1, 1956	30,000
Mar. 1, 1952	20,000	Dec. 1, 1957	40,000
Apr. 1, 1953	25,000		

Technical personnel, Polaris program (p. 155)

In response to Mr. Courtney's question concerning the availability of technical personnel to the Polaris program, at its outset and at the present time, as well as areas from which our professional people are recruited, the following information is offered:

Prior to Aerojet's undertaking the Polaris program (then known as the fleet ballistic missile program) Aerojet had nearly 500 professional employees which could have been applied to the development effort. In April 1956 technical personnel holding degrees, immediately available to our Solid Engine division, were as follows:

Degree:	*Number*
Doctors	36
Masters	46
Bachelors	172
Total	254

In addition to the foregoing technical people holding degrees at that time, the Solid Engine division employed 146 technical personnel working in professional capacities with educational or experience qualifications equivalent to bachelor's degrees or better. At that same time, there were available in other divisions of our company, additional professional people which we were prepared to make available to the Polaris effort. However, as a matter of fact, in the months of April, May, and June, 1956, at the initiation of work on the fleet ballistic missile at Aerojet, the early requirements of the program did not require the application of more than 100 professional technical employees on the project.

As of June 1, 1958, 497 technical people holding degrees were working on the Polaris program at Aerojet. In addition to these, approximately 280 qualified technical personnel were also working on Polaris. The current project, therefore, utilizes nearly 800 qualified technical employees.

Recruiting of professional employees for our solid rocket plant at Sacramento, is typified by the information for the current year. The locations from which we have recruited technical people for solid propellent rocket work for the first 6 months of 1958 are listed below:

Alabama	1	New Jersey	13
Azusa, Calif., plant transfers	91	New York	34
California, other	313	Ohio	24
Colorado	1	Pennsylvania	11
Connecticut	3	Rhode Island	1
Florida	1	Texas	2
Illinois	10	Utah	3
Maryland	1	Washington	8
Massachusetts	2	West Virginia	1
Michigan	24		
Nevada	1	Total	545

It will be appreciated that all of the foregoing recruitments were not only for the Polaris program, but include personnel applied to other important Government projects.

Retired military personnel (pp. 156, 157)

In response to Mr. Courtney's question, Aerojet-General is currently employing 16 retired officers from the military services. The responsibilities within our organization of these people are listed below:

Design engineer A	1	Security supervisor	1
Development engineer A	1	Engineering project assistant A	1
Production engineer A	1	Technical specialist:	
Liaison engineer	1	Planning	1
Quality control engineer B	1	Ordnance	1
Industrial engineer B	1	Engineering representative	1
Outside vendor contact man	1	Management consultants	3
Engineering administrator (safety)	1		

Technical personnel turnover rate (p. 161)

Mr. Courtney asked for Aerojet's labor turnover rate experience with technical personnel. Our recent experience is tabulated below:

	Percent		Percent
January 1958	0.7	April 1958	1.4
February 1958	1.6	May 1958	1.0
March 1958	1.4		

Technical personnel recruitment costs (pp. 161, 162)

Mr. Courtney also inquired as to the costs of recruiting technical personnel at Aerojet.

The average cost of professional personnel employed by Aerojet during the past 6 months has been $410 per hire. This figure includes recruitment advertising, moving expenses, and unusual travel associated with the recruitment. It will be appreciated that many of the professional people employed by Aerojet are recruited locally obviating the cost of moving, etc.

Nontechnical or skilled workers (p. 162)

Mr. Courtney was interested in our experience on wage rates, labor turnover, and recruiting costs on Aerojet's nontechnical or skilled employees (as opposed to technical or professional employees).

Enclosure 5 is a tabulation of the present hourly wage rate ranges of our factory, technical and office job classifications. Our recent experience in the labor turnover rates for nontechnical and skilled workers is tabulated below:

	Percent		Percent
January 1958	2.3	April 1958	1.4
February 1958	1.3	May 1958	1.7
March 1958	1.8		

The average recruiting expense at Aerojet-General for nontechnical and skilled workers for the first 6 months of 1958 is $44.75 per hire.

Aerojet-General is pleased with the opportunity to have provided information for the special subcommittee and with the courtesies extended by its members. Should you desire further information from us in connection with your current hearings, we will provide it upon request.

Yours very truly,

DAN A. KIMBALL, *President.*

ENCLOSURE 1

Aerojet General Corp. analysis of gross fixed assets booked under normal depreciation and accelerated depreciation as of May 31, 1958

	Gross fixed assets booked as of May 31, 1958	Amount of fixed assets booked at May 31, 1958, under—	
		Accelerated amortization	Normal depreciation
Land improvements:			
36 months	$381,766.99		$381,766.99
60 months	2,530,868.88	$1,007,797.42	1,523,071.46
96 months	459,382.14		459,382.14
180 months	120,980.15		120,980.15
240 months	76,882.93		76,882.93
Total	3,569,881.09	1,007,797.42	2,562,083.67
Buildings:			
36 months	16,994.04		16,994.04
48 months	9,215.62		9,215.62
60 months	7,151,667.44	7,151,667.44	
96 months	2,049,168.28		2,049,168.28
120 months	914,463.77		914,463.77
240 months	2,763,097.30		2,763,097.30
281 months	88,000.00		88,000.00
480 months	533,137.23		533,137.23
Total	13,525,743.68	7,151,667.44	6,374,076.24
Machinery and equipment:			
12 months	615.65		615.65
24 months	829.19		829.19
36 months	399,694.36		399,694.36
60 months	1,667,343.04	1,088,218.67	579,124.37
80 months	552.90		552.90
96 months	540,451.05		540,451.05
100 months	165,492.48		165,492.48
120 months	1,376,889.60		1,376,889.60
Total	4,151,868.27	1,088,218.67	3,063,649.60
Furniture and fixtures:			
60 months	126,685.62	84,970.72	41,714.90
96 months	529.29		529.29
120 months	108,566.30		108,566.30
180 months	225,669.71		225,669.71
192 months	214,631.03		214,631.03
240 months	311,466.68		311,466.68
Total	987,548.63	84,970.72	902,577.91
Removable building fixtures:			
60 months	3,861.18		3,861.18
120 months	77,179.61		77,179.61
180 months	2,426.30		2,426.30
240 months	6,205.53		6,205.53
Total	89,672.62		89,672.62
Office equipment:			
24 months	350.00		350.00
36 months	488.74		488.74
48 months	1,018.14		1,018.14
60 months	234,742.42		234,742.42
120 months	290,546.84		290,546.84
Total	527,146.14		527,146.14
Cafeteria equipment: 96 months	39,158.09		39,158.09
Automobiles, trucks, and airplanes:			
24 months	19,081.16		19,081.16
36 months	17,945.24		17,945.24
48 months	820,609.88		820,609.88
Total	857,636.28		857,636.28

ENCLOSURE 1—Continued

Aerojet General Corp. analysis of gross fixed assets booked under normal depreciation and accelerated depreciation as of May 31, 1958—Continued

	Gross fixed assets booked as of May 31, 1958	Amount of fixed assets booked at May 31, 1958, under—	
		Accelerated amortization	Normal depreciation
Leasehold improvements: Term of lease, latest expiration date, Feb. 28, 1963	$145,802.35		$145,802.35
Subtotal	[1] 23,894,457.15	[2] $9,332,654.25	[3] 14,561,802.90
Land	970,229.17		
Total booked	24,864,686.32	9,332,654.25	14,561,802.90
Additions to fixed assets, approved and in process	[1] 5,336,000.00	[4 5] 1,803,527.16	[4 6] 3,532,472.84
Total	30,200,686.32		

[1] 100 percent.
[2] 39.05 percent.
[3] 60.94 percent.
[4] Estimated.
[5] 33.80 percent.
[6] 66.20 percent.

ENCLOSURE 4

Aerojet-General Corp., a subsidiary of the General Tire & Rubber Co.—Fiscal history

AEROJET ENGINEERING CORP.

Fiscal year ending—	General Tire percentage of ownership	Common stock		Preferred stock		Earned surplus	Total net worth
		Number of shares	Capital investment	Number of shares	Value		
Feb. 28, 1943		606.0	$45,000			($1,915)	$43,084
Feb. 29, 1944		916.0	65,375			(4,835)	60,539
Feb. 28, 1945	50	1,026.0	76,375			112,914	189,289
Feb. 28, 1946	68	1,026.0	76,375			324,915	401,290
Feb. 28, 1947	68	1,026.0	76,375			484,439	560,814
Feb. 29, 1948	81	2,000.0	417,275			937,612	1,354,887
Feb. 28, 1949	81	2,000.0	417,275			1,321,599	1,738,874
Feb. 28, 1950	81	2,000.0	417,275			1,709,788	2,127,063
Feb. 28, 1951	81	2,000.0	417,275			2,156,661	2,573,936
Feb. 29, 1952	81	10,000.0	[1] 2,000,000			1,062,981	3,062,981
Feb. 28, 1953	81	10,000.0	2,000,000			1,817,428	3,817,428
Mar. 31, 1953	96	10,000.0	2,000,000			1,582,665	3,582,665

AEROJET-GENERAL CORP.

July 31, 1953	95	396,716.7	[2] $3,967,167	2,716	$2,716,000	$78,880	$6,762,047
July 31, 1954	95	396,716.7	3,967,167	2,716	2,716,000	3,859,287	10,542,454
Nov. 30, 1954	95	396,716.7	3,967,167	2,243	2,243,000	4,334,826	10,544,993
Nov. 30, 1955	95	396,716.7	3,967,167	2,019	2,019,000	6,439,587	12,425,754
Nov. 30, 1956	95	398,166.7	4,112,167	1,795	1,795,000	9,797,858	15,705,025
Nov. 30, 1957	87	431,666.7	11,495,657	1,571	1,571,000	13,574,581	26,641,239
May 31, 1958	87	4,316,667.0	11,495,657	1,571	1,571,000	15,904,907	28,971,565

[1] Includes transfer from earned surplus of $1,582,725.
[2] Change results from a statutory merger of Aerojet Engineering Corp. into Crosley Motors, Inc., with name change to Aerojet-General Corp., and includes additional paid-in capital of $554,727 and transfer from earned surplus of $1,412,440.

NOTE.—Pennies omitted.

ENCLOSURE 5

Aerojet-General Corp.

INDEX OF FACTORY JOB CLASSIFICATIONS AND RATE RANGES

[Effective date, May 12, 1958; reissued July 9, 1958]

Code [1]	Title	Rate range	Labor charge
506	Assembler, coil	$1.83–$2.04	D
551	Assembler, electromechanical unit, production	2.04– 2.25	D
505	Assembler, general [2]	2.24– 2.45	D
510	do.[3]	2.01– 2.22	D
515	Assembler, igniter	2.17– 2.38	D
517	Assembler, metal fitting [2]	2.24– 2.49	D
518	do.[3]	2.04– 2.23	D
788	Assembler, plastics	2.04– 2.25	D
519	Assembler, precision	2.38– 2.59	D
520	Assembler, production [2]	2.04– 2.25	D
525	do.[3]	1.83– 2.04	D
530	Blender operator	2.34– 2.55	D
531	Blender and polisher	2.07– 2.28	D
533	Brazing equipment operator	2.04– 2.25	D
535	Burrer, hand and power	1.83– 2.04	D
538	Bus driver, intraplant	2.07– 2.28	I
540	Carpenter, maintenance [2]	2.55– 2.76	[4] I
541	do.[3]	2.31– 2.52	[4] I
546	Ceramic process operator	2.31– 2.51	D
542	Chemical plant operator [2]	2.29– 2.50	D
543	do.[3]	2.05– 2.26	D
544	Chemical plant operator, senior	2.51– 2.71	D
545	Control man	2.11– 2.32	I
547	Crate and box maker	2.21– 2.41	I
553	Electrical wire worker	1.83– 2.04	D
557	Electrician, lineman	2.78– 2.99	I
550	Electrician, maintenance [2]	2.75– 2.96	[4] I
555	do.[3]	2.48– 2.69	[4] I
567	Electroplater, helper	2.01– 2.22	D
570	Grinder operator	2.34– 2.55	D
578	Grinder, tool and cutter	2.71– 2.97	D
586	Heat treater [2]	2.64– 2.84	D
587	do.[3]	2.42– 2.62	D
576	Hydrostatic and rework man	2.18– 2.39	D
577	Inspector, blender and grinder	2.54– 2.75	D
583	Inspector, electronic-electrical	2.71– 2.97	I
584	Inspector, electronic systems	2.90– 3.15	I
575	Inspector, experimental	2.71– 2.97	I
580	Inspector, experimental process [2]	2.64– 2.86	D
581	do.[3]	2.38– 2.59	D
585	Inspector, gage [2]	2.71– 2.97	I
590	do.[3]	2.45– 2.66	I
595	Inspector, general assembly [2]	2.18– 2.39	I
600	do.[3]	1.95– 2.15	I
605	Inspector, machined parts	2.37– 2.58	I
610	Inspector, optical [2]	2.81– 3.08	I
611	do.[3]	2.55– 2.75	I
620	Inspector, production assembly [2]	2.04– 2.25	I
625	do.[3]	1.83– 2.04	I
630	Inspector, production process [2]	2.37– 2.58	D
635	do.[3]	2.15– 2.36	D
636	Inspector, propellent dimension	2.39– 2.60	D
638	Inspector, radiographic [2]	2.71– 2.97	D
639	do.[3]	2.45– 2.66	D
640	Inspector, receiving	2.28– 2.49	I
642	Inspector, senior	2.59– 2.80	I
643	Inspector, tooling	2.90– 3.15	D
645	Instrument maker [2]	2.61– 2.82	D
650	do.[3]	2.36– 2.57	D
651	Instrumentation serviceman [2]	2.71– 2.97	D
652	do.[3]	2.45– 2.66	D
655	Janitor	1.80– 2.01	I
660	Laboratory assistant [2]	2.18– 2.39	D
665	do.[3]	1.95– 2.15	D
670	Laboratory cleanup man	1.78– 1.99	I
	Leadman	[5]	[5]
673	Lubrication man	2.01– 2.21	I
675	Machine-tool repairman [2]	2.71– 2.97	[4] I
676	do.[3]	2.45– 2.66	[4] I
677	do.[5]	2.22– 2.43	[4] I
679	Machinist	2.51– 2.68	D
680	Machinist, bench	2.40– 2.61	D
685	Machinist, general	2.71– 2.97	D
690	Machinist, propellent	2.34– 2.55	D
687	Machinist, test specimen	2.64– 2.86	D
695	Maintenanceman	1.98– 2.18	I

See footnotes at end of table.

ENCLOSURE 5—Continued

Aerojet-General Corp.—Continued

INDEX OF FACTORY JOB CLASSIFICATIONS AND RATE RANGES—Continued

[Effective date, May 12, 1958; reissued July 9, 1958]

Code [1]	Title	Rate range	Labor charge
692	Material-distribution man	$2.21–$2.41	I
693	Mechanic, air conditioning and refrigeration	2.65– 2.86	[4] I
703	Mechanic, ceramic development [2]	2.64– 2.86	D
704	----do.[3]	2.38– 2.59	D
697	Mechanic, components test [2]	2.71– 2.92	D
698	----do.[3]	2.45– 2.66	D
702	Mechanic, development rocket controls	2.71– 2.97	D
552	Mechanic, electromechanical assembly	2.28– 2.49	D
706	Mechanic, experimental liquids [2]	2.64– 2.86	D
707	----do.[3]	2.38– 2.59	D
710	----do.[5]	2.16– 2.37	D
708	Mechanic, experimental solids [2]	2.64– 2.86	D
709	----do.[3]	2.38– 2.59	D
710	----do.[5]	2.16– 2.37	D
719	Mechanic, explosive ordnance test [2]	2.71– 2.97	D
720	----do.[3]	2.45– 2.66	D
711	Mechanic, flight line	2.71– 2.97	I
715	Mechanic, heavy duty (truck)	2.54– 2.75	I
730	Mechanic, maintenance [2]	2.65– 2.86	[4] I
735	----do.[3]	2.39– 2.60	[4] I
731	Mechanic, plastics [2]	2.64– 2.86	D
732	----do.[3]	2.38– 2.59	D
724	Mechanic, solid propellent development	2.64– 2.86	D
736	Mechanic, test equipment [2]	2.64– 2.86	D
737	----do.[3]	2.38– 2.59	D
739	Metalsmith, experimental	2.71– 2.97	D
740	Model builder	2.71– 2.97	D
745	Modelmaker, experimental	2.91– 3.15	D
747	Mold-release operator	2.11– 2.32	D
750	Nurse, industrial	2.32– 2.55	I
752	Operator, solid propellent	2.38– 2.59	D
757	Packager and freight handler	2.04– 2.25	[4] I
760	Painter, aircraft	2.24– 2.45	D
765	Painter, maintenance	2.44– 2.65	I
770	Painter, production [2]	2.11– 2.32	D
775	----do.[3]	1.88– 2.09	D
785	Plaster and cement man	2.48– 2.69	I
791	Plastics assembly fabricator, senior	2.24– 2.45	D
789	Plastics helper	1.83– 2.04	D
787	Plater, experimental	2.53– 2.73	D
792	Plater, general	2.24– 2.45	D
790	Plating-equipment operator	2.21– 2.42	D
794	Power sweeper	1.98– 2.19	I
795	Process operator	2.04– 2.25	D
797	Processor, solid propellent	2.24– 2.45	D
800	Production machine operator [2]	2.28– 2.49	D
805	----do.[3]	2.04– 2.25	D
806	Propellent serviceman	2.34– 2.55	[4] I
808	Restriction preparation operator	2.11– 2.32	D
817	Salvage Conservation man	2.64– 2.86	I
810	Salvage-disposal man	2.16– 2.37	I
818	Salvage yardman	2.16– 2.37	I
815	Sandblaster	2.22– 2.43	D
820	Sheet-metal fabricator [2]	2.68– 2.89	D
821	----do.[3]	2.42– 2.63	D
825	Shop dispatcher [2]	2.30– 2.51	I
830	----do.[3]	2.06– 2.27	I
835	Stationary engineer	2.49– 2.70	I
840	Stock clerk [2]	2.09– 2.30	I
845	----do.[3]	1.85– 20.6	I
838	Stock cutoff man, general	2.24– 2.46	D
863	Technician, controls research	2.71– 2.97	D
862	Technician, controls research senior	2.91– 3.15	D
853	Technician, crew		I
548	Technician, electrical [2]	2.71– 2.97	D
549	----do.[3]	2.45– 2.66	D
560	Technician, electronic [2]	2.76– 3.03	D
565	----do.[3]	2.51– 2.72	D
561	Technician, electronic systems research	2.90– 3.15	D
653	Technician, instrumentation [2]	2.71– 2.97	D
654	----do.[3]	2.45– 2.66	D
856	Technician, medical laboratory		I
755	Technician, optical experimental	2.81– 3.08	D
780	Technician, pilot plant	2.73– 2.99	D
857	Technician, precision optical [2]	2.71– 2.97	D

See footnotes at end of table.

ENCLOSURE 5—Continued

Aerojet-General Corp.—Continued

INDEX OF FACTORY JOB CLASSIFICATIONS AND RATE RANGES—Continued

[Effective date, May 12, 1958; reissued July 9, 1958]

Code [1]	Title	Rate range	Labor charge
858	Technician, precision optical [3]	$2.45-$2.66	D
811	Technician, rocket test [3]	2.71- 2.97	D
812	do. [3]	2.45- 2.66	D
847	Tire changer-wheel balancer	2.15- 2.36	I
848	Tool-control man	2.45- 2.65	I
850	Tool-crib attendant [2]	2.09- 2.30	I
855	do. [3]	1.86- 2.07	I
859	Tool jig and fixture builder	2.90- 3.15	D
860	Tool sharpener (small tools)	2.17- 2.38	I
865	Trainee, production assembler [6]	1.60- 1.71	D
868	Truckdriver, general	2.28- 2.49	I
870	Truckdriver, inside	2.16- 2.37	I
880	Truck operator, industrial	2.04- 2.25	D
885	Utility worker	1.88- 2.09	[4] I
890	Welder, combination	2.52- 2.73	D
895	Welder, layout	2.71- 2.97	D
900	Welder, spot	2.22- 2.43	D
902	Winder, coil	2.04- 2.25	D
904	X-ray film developer	2.24- 2.45	D
905	X-ray operator, industrial	2.34- 2.55	D

INDEX OF TECHNICAL AND OFFICE JOB CLASSIFICATIONS AND RATE RANGES, AZUSA PLANT

[Effective date, May 12, 1958; reissued July 8, 1958]

004	Accountant	$2.19-$2.57	I
014	Analyst, mathematical	2.73- 3.05	D
025	Blueprint machine technician [3]	2.49- 2.75	I
026	do. [3]	2.24- 2.51	I
032	Bookkeeping machine operator [3]	1.93- 2.26	I
036	do. [3]	1.65- 1.99	I
040	Buyer	2.24- 2.57	I
041	Cafeteria, chief assistant	2.29- 2.49	I
044	Cashier	1.96- 2.35	I
048	Chef	2.34- 2.78	I
008	Clerk, accounting [2]	1.93- 2.21	I
012	do. [3]	1.58- 1.99	I
016	Clerk, blueprint [3]	1.88- 2.21	I
020	do. [3]	1.40- 1.93	I
024	Clerk, blueprint, chief	2.23- 2.45	I
052	Clerk, chief	2.09- 2.57	I
088	Clerk, department [2]	1.88- 2.21	I
092	do. [3]	1.48- 1.99	I
132	Clerk, electronic technical data	1.83- 2.26	D
146	Clerk, engineering project [2]	1.88- 2.21	D
147	do. [3]	1.48- 1.99	D
160	Clerk, general	1.40- 1.99	I
212	Clerk, material control [2]	2.00- 2.33	I
216	do. [3]	1.65- 2.04	I
055	Clerk, personnel security	2.07- 2.39	I
364	Clerk, technical data [2]	1.88- 2.21	D
368	do. [3]	1.48- 1.93	D
372	Clerk, technical report [2]	1.93- 2.21	D
376	do. [3]	1.48- 1.99	D
396	Clerk, traffic rate [2]	2.46- 2.90	I
400	do. [3]	2.08- 2.40	I
056	Clerk-typist	1.48- 1.99	I
058	Clerk-typist, statistical	1.78- 2.10	D
060	Commissary attendant	1.54- 1.99	I
064	Commissary forewoman	1.93- 2.21	I
067	Communications operator, assistant chief	2.13- 2.39	I
072	Comptometer operator [2]	1.93- 2.26	I
076	do. [3]	1.60- 1.99	I
080	Cook [2]	2.01- 2.40	I
084	do. [3]	1.78- 2.05	I
085	Cook, chief	2.23- 2.55	I
093	Data-machine operator [3]	2.01- 2.35	D
094	do. [3]	1.65- 2.05	D
095	Data-processing specialist	2.72- 3.14	D
096	Dishwasher	1.48- 1.93	I

See footnotes at end of table.

ENCLOSURE 5—Continued

Aerojet-General Corp.—Continued

INDEX OF TECHNICAL AND OFFICE JOB CLASSIFICATIONS AND RATE RANGES, AZUSA PLANT—Continued

[Effective date, May 12, 1958; reissued July 9, 1958]

Code [1]	Title	Rate range	Labor charge
100	Draftsman, detail [2]	$2.19–$2.57	D
104	do.[3]	1.93– 2.21	D
108	do.[5]	1.48– 1.99	D
110	Draftsman, engineering design	2.89– 3.33	D
112	Draftsman, layout [2]	2.46– 2.98	D
116	do.[3]	2.19– 2.57	D
120	do.[5]	1.70– 2.21	D
124	Draftsman, patent	2.46– 2.98	D
128	Duplicating-machine operator	1.65– 2.21	D
136	Engineering aid	2.25– 2.70	D
138	Engineering assistant (test)	2.83– 3.30	D
140	Engineering liaison man [2]	2.14– 2.57	D
144	do.[3]	1.88– 2.21	D
150	Engineering release man	2.31– 2.70	D
152	Fireman	2.05– 2.26	I
153	Fireman-engineer	2.19– 2.40	I
156	Food checker	1.88– 2.15	I
158	Guard [2]	2.05– 2.26	I
159	do.[3]	1–84– 2.05	I
161	Guard-fireman [2]	2–14– 2.35	I
162	do.[3]	1.90– 2.11	I
163	Guard-fireman, Lt	2.56	I
176	Illustrator [2]	2.09– 2.57	D
180	do.[3]	1.60– 2.10	D
184	Interviewer	2.18– 2.51	I
188	Key punch operator [2]	1.88– 2.14	I
192	do.[3]	1.55– 1.99	I
193	Laboratory technician, senior (chemical)	2.88– 3.30	D
202	Laboratory technician, senior (materials)	2.88– 3.30	D
195	Laboratory technician, senior (welding and brazing)	2.94– 3.30	D
196	Laboratory technician [2]	2.46– 2.87	D
200	do.[3]	2.08– 2.45	D
204	Librarian, assistant	1.83– 2.15	I
206	Machine-tool liaison man	2.46– 2.98	I
208	Mail supervisor	2.01– 2.35	I
210	Manufacturing liaison man	2.40– 2.78	D
211	Material analyst	2.41– 2.67	I
220	Material-control specialist	2.24– 2.57	I
224	Material-release man [2]	2.19– 2.57	I
228	do.[3]	1.88– 2.21	I
232	Messenger	1.48– 1.93	I
235	Office storekeeper, senior	2.41– 2.73	I
236	Office storekeeper	2.18– 2.51	I
240	Photographer [2]	2.24– 2.57	D
244	do.[3]	1.93– 2.26	D
247	Photographer, technical, senior	3.21	D
248	Photographer, technical	2.69– 3.01	D
250	Photographic cameraman, editor	2.91– 3.15	D
252	Photographic laboratory man [2]	2.18– 2.45	D
256	do.[3]	1.93– 2.21	D
260	Planner, engineering	2.14– 2.57	I
264	Planner, production [2]	2.37– 2.70	I
268	do.[3]	2.13– 2.40	I
272	Printer [2]	2.56– 2.82	D
276	do.[3]	2.19– 2.57	D
284	Procurement followup man [2]	2.25– 2.64	I
288	do.[3]	1.93– 2.26	I
292	Production control dispatcher [2]	2.01– 2.35	I
296	do.[3]	1.60– 2.10	I
300	Production control dispatcher, chief	2.34– 2.78	I
304	Production coordinator	2.25– 2.70	I
306	Propellent control assistant [2]	2.17– 2.43	I
307	do.[3]	1.75– 2.19	I
310	Receptionist, security	2.00– 2.33	I
311	Reservationist, transportation	2.23– 2.56	I
308	Scheduler [2]	2.40– 2.78	I
312	do.[3]	2.08– 2.40	I
316	Secretary	2.01– 2.40	I
320	Secretary, administrative	2.38– 2.70	I
324	Shop followup man	2.13– 2.51	I
328	Statistician [2]	2.31– 2.64	D
332	do.[3]	1.96– 2.35	D
334	Statistician, senior	2.58– 2.90	D

See footnotes at end of table.

ENCLOSURE 5—Continued

Aerojet-General Corp.—Continued

INDEX OF TECHNICAL AND OFFICE JOB CLASSIFICATIONS AND RATE RANGES, AZUSA PLANT—Continued

[Effective date, May 12, 1958; reissued July 9, 1958]

Code [1]	Title	Rate range	Labor charge
336	Stenographer [2]	$1.88–$2.10	I
340	do.[2]	1.48– 1.93	I
344	Switchboard operator [2]	1.88– 2.15	I
348	do.[2]	1.48– 1.93	I
351	Tabulating-machine operator, senior	2.21– 2.51	I
352	Tabulating-machine operator [2]	2.01– 2.35	I
356	do.[2]	1.83– 2.05	I
357	do.[2]	1.52– 1.90	I
360	Tabulating-machine setup man	2.31– 2.64	I
362	Tabulating specialist	2.54– 2.84	I
378	Time auditor	2.24– 2.51	I
379	Time auditor, senior	2.46– 2.73	I
380	Timekeeper	1.97– 2.35	I
384	Timekeeper, head	2.56– 2.88	I
388	Tool liaison man [2]	2.52– 3.07	I
392	do.[2]	2.18– 2.51	I

[1] The code number for leadmen should be indicated by the code number for the regular classification followed by "–2."

[2] Progression from the minimum to the maximum of the rate range shall be in accordance with the following procedure:

1. 30 days after the successful completion of the 30-day probationary period, newly hired factory employees shall receive a 10-cent-per-hour automatic increase.

2. Following the effective date of the 60-day automatic increase, each employee shall be reviewed at 6-month intervals for the purpose of determining whether or not his job performance warrants a wage increase. Should the review result in an increase in rate, such increase shall become effective on the pay period falling nearest to the employee's review date. Nothing herein shall prohibit the company from granting a wage increase in excess of 5 cents per hour should performance warrant such consideration.

3. The employee and the union will be given a copy of such review no later than 5 working days following the effective date of the review. Any complaints as to results of a review, or failure to receive a review, may be filed through the grievance procedure.

[3] Leadmen shall receive at the time of appointment 20 cents per hour above the maximum rate for the highest paid job normally and regularly led, but shall not receive a change in his present classification as a result of the appointment unless his job duties have changed.

[4] Employees in indirect labor classifications indicated with a reference 4, i. e., "Carpenter—Maintenance," "Electrician—Maintenance," "Machine tool repairman," "Mechanic—Maintenance," "Mechanic—Air conditioning and refrigeration," "Packager and freight handler," "Propellent serviceman," and "Utility worker," which are predominantly indirect labor classifications, may charge time to work orders when the nature of their work warrants such charges. (Examples of such work are the construction of pallets, shoring of boxcars for shipment, installation of machinery and equipment purchased on a direct work order or on an Aerojet work order that is to be capitalized upon completion, etc.)

[5] The classifications of "Experimental mechanic" (reference 5), and "Machine-tool repairman (reference 5), are to be used solely for the purpose of offering promotion to employees in lower-rated classifications.

[6] Production assembler, trainees, shall be governed by the following automatic rate progression system:

	Old rate	New rate
Hiring rate	$1.42	$1.60
30 days	1.47	1.65
60 days after hire	1.53	1.71
90 days after hire: Production assembler (footnote 3, above)	1.65	1.83

NOTE. Either a rate increase must be authorized by the employee's supervisor at the expiration of each progression period or the employee terminated. Once a "Trainee" has been reclassified to "Production assembler" (footnote 3, above), he does not receive the regular 10-cent automatic increase at the end of the next 60 days.

Union representation: All factory classifications are represented by the International Association of Machinists, AFL–CIO.

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